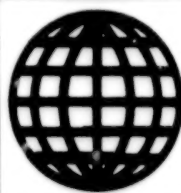


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11 JANUARY 1991



**FOREIGN
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JPRS Report

Science & Technology

***USSR: Science &
Technology Policy***

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Academician Ginzburg Endorses Gorbachev Decree, Statute Changes

917A0004A Moscow IZVESTIYA in Russian 7 Oct 90
Morning Edition p 3

[Article by V. Ginzburg, academician, USSR people's deputy: "The Future of the Academy"]

[Text] On 23 August 1990, the USSR President issued the Ukase "On the Status of the USSR Academy of Sciences," according to which the USSR Academy of Sciences is to become an all-Union self-managing organization functioning "on the basis of USSR laws and the Academy Statutes without any interference whatsoever on the part of state or other structures...."

When I read the Ukase, the drafting of which I did not know about, on the whole I regarded to it quite positively. As far as I know, such was also the reaction of most academy members and associates. However, there were also objections, sometimes very sharp. A protest rally against the Ukase was held in front of the USSR Academy of Sciences Presidium building on 13 September. What were the motives of the protesters? First, they were expressing doubt in the president's right to issue such Ukases and, mainly, they believe that we should await the conclusion of the Union Treaty. Second, they claimed that the Ukase obstructs the creation of a Russian Soviet Federated Socialist Republic (RSFSR) Academy of Sciences and was issued hastily and without discussion in scientific circles precisely for this purpose. Third, the Ukase in fact puts the entire academy in the power of roughly 300 academicians who, according to its statutes, control the academy.

Of course, the Union Treaty is urgently necessary. However, does this mean that we will sit on our hands waiting for it? One would hope that the USSR will nonetheless remain a unified state. It is my deep conviction that precisely such a resolution, preserving the mighty union formation, best of all answers the goals of establishing a modern, civilized, genuinely democratic (which also means rule-of-law) society. In a Union state, obviously a number of general, central agencies should exist which carry out defense, foreign affairs, communications, transport, finances, etc.. It goes without saying, in these areas it is a question not of full centralization, but of sharing powers with the republics. Concern for scientific research work can and should be included among the Union functions.

Today, the development of a number of scientific fields costs a tremendous amount of money and requires the existence of a large number of first-class specialists, etc. The solution of a number of scientific problems is not within the strength even of states with populations of many millions (such as Great Britain, France, and Germany), and they have combined their efforts (it is a question, for instance of high energy physics and space research). Another center of modern science is located in the U.S., yet even this wealthy country attracts foreign forces and resources for development of its own basic

scientific research. The third scientific center of the world is in Japan, but in terms of scope it is inferior to the American and European centers. Finally, another center of world science is the U.S.S.R., even though we lag behind in many ways. However, in a number of disciplines (for instance, physics and mathematics) we have many highly skilled people, and if not for them, the worrisome "brain drain" would not have appeared.

Basic science in our country can be first-rate only if it is supervised by a powerful state. It is naive to think that fully independent "big" science, sometimes requiring billions in capital investments, can develop in republics with a population of several million people.

Since any remark allegedly belittling the dignity of individual republics is often perceived painfully here, let me add the following. Modern science, first-rate in terms of level, can also exist in small countries (the Netherlands with a population of about 15 million people serves as an example). In this regard, however, not even to mention its years of traditions and well-organized education, the scientific front there is relatively narrow and cooperation with the above-mentioned scientific centers is inevitable.

In short, we are reinforcing the Union-wide center for basic science. Precisely this was the goal of the President's Ukase, which can only be welcomed.

Essentially, I see no infringements on the rights of RSFSR in this. About 96 percent of the USSR Academy of Sciences members live and work in the RSFSR. It would even be possible to hang up different sign and call the USSR Academy of Sciences the RSFSR Academy of Sciences. But what would this offer? Indeed, nothing positive: it would lead only to a weakening of ties with science in other republics and would hinder the development of a powerful Union-wide scientific center, as noted above. If this center functions well, it can only be advantageous for the scientific organizations of all republics to support it and, in exchange, receive opportunities about which small states cannot even dream. After all, the countries joining the European community are acting precisely thus.

Of course, concern for the development of science in the RSFSR is also entirely topical and natural. The question is how to do this. I rejoiced at information in IZVESTIYA No 257 this September, stating that the RSFSR Supreme Soviet realizes that concern for Russian science should not be reduced to bureaucratic games aimed at increasing the number of Russian academicians, etc. With the preservation of a Soviet Union headed by Russia (I see no infringement at all on the rights of other republics in stating this obvious fact), I doubt that some kind of centralized RSFSR Academy of Sciences is needed in general. The USSR Academy of Sciences played this role and will continue to play it, and Russia should not take offense at this. The formation in the RSFSR of various sectorial academies and scientific societies is another matter.

However, two circumstances make me wary. The first is our attraction to the word "academy." We have created a scientific society, which is good, but calling it an academy, I fear, is necessary only so that the society's members can be called academicians. Right now, usually no such titles are used abroad in general: they use the title of professor or doctor. At the end of scientific articles they thank people, mentioning only their names, but here we always list endless academicians and professors. They have noticed this weakness of ours for titles abroad and, most likely, laugh at it, as well as at a great deal else. This August, when I gave a scientific report in England, I was asked if the announcement should state that precisely Academician Ginzburg would be speaking, and sighed in relief when I requested that they by no means do this.

I must make yet another observation, for the information referred to included lines about the so-called scientific discoveries. Surprise was even expressed that "only a few of the acting members of the USSR Academy of Sciences" possess these "discoveries." The point is that a large part of the members of the USSR Academy of Sciences or, in any case, a significant share of them, considers the registration of "discoveries," started in 1957 in the USSR, to be purely a bureaucratic conceit and a meaningless expenditure of effort. We have been trying for 30 years to abolish such registration, but the Committee On Inventions and Discoveries, having seized it with a death grip, does not want to reject this conceit, which is advantageous for it. True, the registration of "discoveries" has other supporters. Those who desire to familiarize themselves with this problem may refer to a number of articles in PRAVDA on 1 June 1988 and to my article "Once More On the Registration of So-Called Discoveries," which will be published in VESTNIK AN SSSR, No 10, 1990. In any case, many members of the USSR Academy of Sciences have no certificates of "discoveries," due not to a lack of scientific discoveries, but in connection with the lack of desire to register them, since they deny the justification of such registration. Under such conditions, I consider it entirely impractical to create some kind of "academy" based on the possession of "certificates of discovery" by its members.

Finally, the truly important question: can the USSR Academy of Sciences, guided by its existing statutes, ensure the noble goals of the President's Ukase? I must give a negative answer to this. The reason is the undemocratic nature of the statutes. According to the existing USSR AS Statutes, only about 300 acting members (academicians), whose average age now exceeds 70 years, have the right to deciding votes at general meetings of the USSR AS. Only academicians may elect the academy presidium. Precisely the presidium, consisting of about 40 people, including all the former presidium members (about 20 people) who have been named advisors to the presidium, controls the academy. Typically, said advisors only ceased to be presidium members in 1987, since they had passed the age of 75. I myself am 74, hence it is obvious that I relate to the old and elderly without prejudice. However, one cannot help but understand certain restrictions stipulated by age. I will not concern myself here with the

creation of the institution of advisors to the presidium itself, in no way reflected in the statutes and serving the purpose only of retaining all the privileges of presidium members for its former members. It is more important that the USSR AS corresponding members, who are also considered academy members, do not have the right to vote in elections of the presidium and, of course, cannot become presidium members.

This spring, the Commission on Changing the Academy Statutes submitted a proposal to grant corresponding members the right to vote in elections of the presidium (it was not even a question of their joining the presidium). However, the presidium did not even submit this proposal for discussion at the General Meeting, as well as a number of other commission suggestions aimed at improving the statutes.

In the situation that has formed after the release of the presidential Ukase, transformation of the Academy Statutes should, in my opinion, be reduced primarily to granting the corresponding members all rights except the right to elect academicians. In particular, corresponding members should be able to elect the presidium and to join it with rights equal to those of academicians. Moreover, the number of corresponding members could certainly be increased to 800-900 people, having kept 300 academicians. Here, a question arises of whether or not to eliminate the difference between academicians and corresponding members in general (such suggestions have been made repeatedly). However, this difference appeared in our academy historically, and for a number of reasons right now I would not equalize all members of the Academy (incidentally, two membership categories also exist in some foreign academies).

In addition, by implementing the above-given rules the difference between academicians and corresponding members will shift, so to speak, into the sphere of respect and will not affect the leadership of the academy. It will be possible to return to this question in the future.

Roughly 60,000 scientific employees work in USSR AS institutes. It is clear that they, not being academy members, still ought to be able to participate in its leadership, in the work of the General Meeting. This has already been done in the elections of USSR people's deputies from the USSR Academy of Sciences. It is not entirely clear to me what the rights of scientific workers should be. This must be discussed. One possibility would be their participation in elections of the presidium. Incidentally, there are well-known proposals to grant the right to elect academy members, for instance, to doctors of sciences. However, we must not do this. Only academy members should elect new members: this procedure exists throughout the world and is justified. Suffice it to say that by no means can only academy associates be elected to the academy. Furthermore, only a certain share, a relatively small part of all doctors of sciences in the country, it seems, work in the academy. So, how will elections be held? Will an all-Union referendum be held? At the same time, academy non-members can and should

influence the election of academy members, actively participating in their nomination and in the discussion of candidacies. Thus, the necessary democratization of the statutes basically reduces to the two points mentioned above.

Of course, improving the statutes is not limited to their democratization. The problem of ownership of academic institutions and questions about the rights of owners or about the training of highly skilled cadres in the academy, etc., are also important. One such question is how to develop and pass the new statutes. This probably cannot be done on the basis of the existing statutes, but only through some kind of referendum of all academy scientific associates. Self-management of the academy will appear in this. Alternative drafts of the statutes could be submitted for the referendum, for instance, by the existing presidium, the Commission of the General Meeting, or a commission elected by the academy's scientific associates.

It goes without saying, changing the statutes is only one of the necessary conditions for the successful development of the USSR AS and of basic science in our country. Other prerequisites include the reorganization of academy operations and improved coordination of its work with other scientific organizations and academies, especially in the republics, etc. Organizing the activity of a basic research fund, a method for creating a council for this fund, etc., can be considered most important. This is not even to mention providing the necessary material support for basic science (money, equipment, construction) or, in general, our country's emergence from the crisis. One would like to hope that this is not far distant.

However, even in this case we cannot get by without democratizing the statutes. If this is not done, the USSR AS will wither and, figuratively speaking, will turn into an Academy of Sciences of Oktyabrskiy Rayon of Moscow. After all, the presidium and a significant share of the academy's institutes are located in this rayon. As far as I personally am concerned, for reasons that I do not wish to explain here, I would be quite calm about being called an acting member of the Academy of Sciences of Oktyabrskiy Rayon.

However, that would be a shame for the Academy of Sciences....

Politics Surrounding Presidential Decree on Academy of Sciences

917A0032A Moscow RADIKAL in Russian No 1, Oct 90 pp 2-3

[Article by Vladimir Pokrovskiy, editor of the Science Department of RADIKAL, under the rubric "The Extraction of the Essence": "On Behalf of a 'Few' People. Who Will Become Master of the USSR Academy of Sciences and Its Property After the Presidential Ukase?"; first four paragraphs are author's introduction]

[Text] The crisis of interest in popular science literature, which broke out in the early 1980's, was unexpected for everyone. Many popular science journals ceased existence, the circulation of the recognized king of "popular science"—the journal SCIENTIFIC AMERICAN—decreased greatly. But meanwhile it would be strange to expect otherwise. For a long time the Jules Verne attitude toward science, for which only the possibility of giving people miracles was recognized, did not suit the reading public. We saw a lot of miracles and, having seen them, became accustomed to them, but proved to be entirely unprepared for the fact that the good fairy Science can, when the opportunity offers, also prove to be a witch—an infinitely cruel, horrible, apocalyptic one. The atomic bomb, Chernobyl, and ecological and other future catastrophes somehow were not conducive to the singing of the hymn "Oh, how many wonderful discoveries we have...."

In our country this crisis, as is known, has been aggravated to the limit, to the point of lack of faith in science in general.

Having gotten rid of excessive optimism, we simultaneously lost to a significant degree one very important property of human nature—the thirst for knowledge, the sacred curiosity, the involvement in the secret being revealed, without which normal existence is impossible. Worse than that, we learned that domestic science itself is going through a crisis that is even more dangerous in the potential consequences. The progressing decline of its productivity and world prestige, suppression, forced dependence on the powers that be, the brain drain, the confrontation of the scientific community with its elite upper crust—the academy, confusion with financing, and much else—these are the symptoms of this crisis.

The Science Department, the materials of which you will encounter on the next two pages, regards as its main task to trace both crises. Both optimism and pessimism are equally inappropriate here. That is why, having made use of the definition of the mathematical term "radical"—"extraction of the root, the essence"—we gave such a name to the science rubric. Here is what we will attempt to do each time, when determining the place of one or another event being described—to get to the very essence.

On 21 September, a little more than a month after its origination, it is possible to say, the presidential Ukase "On the Status of the USSR Academy of Sciences" has passed away in a boson. More precisely, its second article, which puts "the fixed capital and other state property, which is...in the use of institutes, laboratories, enterprises, and organizations" of the Academy, in its "exclusive ownership," was suspended by a decision of the RSFSR Supreme Soviet.

But it does not seem to us that the incident is over. And it is a matter not even of the fact that the laws of events of a larger scale and, perhaps, of greater importance for us today are reflected in this event, no. The incident with the Ukase is an event of the disease of our science. We do not know how this disease will manifest itself the next

time, but we should meet any relapse of it, at least by knowing thoroughly about the preceding ones.

I should, perhaps, begin with the fact that on 13 September, just one-and-one-half years ago, scientists gathered again in front of the building of the Presidium of the USSR Academy of Sciences. The last time, let us recall, the scientific community was outraged by the fact that the Presidium of the USSR Academy of Sciences had not nominated Andrey Dmitriyevich Sakharov as a candidate for USSR people's deputy. Now the presidential Ukase was the "hero of the day," but they spoke not so much about it as (like the last time) about the defects of today's Academy.

The continuity of these two rallies was also underscored by the fact that mainly the same people organized them—only now they were already united in official structures: the Club of Voters from the Academy and the Moscow Union of Scientists. Today's strong politicization of scientific people, it would seem, should have brought together at the steps of the Presidium of the Academy thousands of dissatisfied people, but far fewer people came than in the past. Some 300, at most 400 people....

This time there was not the restrained fight of journalists for a place a little closer to the rostrum, there was not the "forest" of video cameras and hands with dictating machines. There was not the angry human pressure, the frenzied chanting, when the air itself, it seems, is filled with protest. They stood in a loose semicircle near a truck with a microphone in the cab, and only one poster stuck up over their heads—a dwarf, frivolous one, which was almost pitiful in its solitude: "Dear Fellow President of the USSR!..." And the constitutional democrats for no apparent reason unfurled their banner—a green panel with a swan in the center.

What is the matter? For a superserious question had been raised. They had gathered neither more nor less than with regard to the embezzlement of vast, incalculable property, which had been created by generations of Russian scientists, and its transfer to a few hands—that is how the speakers characterized the Ukase. But whereas last year the reaction to the failure to nominate Sakharov was clear—a furious protest—the presidential Ukase was calmly accepted by many people. First, because presidential ukases are often perceived in our country as something that soon either will be repealed or will be happily forgotten. And, second, because this Ukase has at least two interpretations.

The first of them was expressed back on 27 August in the Appeal of the Club of Voters attached to the USSR Academy of Sciences and the Moscow Union of Scientists to the Committee for Science and Public Education of the RSFSR Supreme Soviet, which was approved at a meet of scientific associates from 70 Moscow academic institutes.

"This Ukase," it is stated in the Appeal, "which was prepared in secret from the scientific community, from the members of the union parliament and the republic

parliament, and even from the members of the Committee for Science of the Russian Soviet Federated Socialist Republic (RSFSR) Supreme Soviet, is nothing but a concealed attempt to torpedo Russian sovereignty and to deprive the Russian Federation of its basic intellectual potential, which is concentrated at the scientific institutions of the USSR Academy of Sciences, which are located almost exclusively on the territory of the RSFSR and are financed to a significant degree from the assets of Russia.

"This aspect of the Ukase seems quite obvious....

"Another thing is significantly less obvious: the legally unprecedented attempt of one person (even if the President) to declare as the 'exclusive property' of a small group of people an entire sector of the national economy, which includes more than 300 large scientific research institutes and enterprises.

"In other words, in promulgating this Ukase, the President with a stroke of the pen is giving the representatives of the academic elite, which is elected for life, a fortune of incredible size. We want to stress: not all the personnel of academic institutions, but namely the 300 academicians, inasmuch as in the now prevailing Charter of the USSR Academy of Sciences only the full members of the Academy are considered full-fledged members of this 'self-managed organization.'

"By establishing such a gigantic concern, which has a monopoly of all basic science, the President and his advisers, who prepared the Ukase, are reinforcing the administrative command structure of the management of science, which has discredited itself and in case of which the elite scientific club also performs the functions of a ministry of science. The authors of the Ukase have become so accustomed to this function of the Academy of Sciences that they did not notice an obvious absurdity in its text: The Ukase, on the one hand, declares the independence of the Academy from state organs, but, on the other, orders the USSR Council of Ministers to revise the system of salaries and wage rates, which are in effect at the Academy. But if as before the USSR Council of Ministers specifies the amounts of salaries and wage rates, of what independence of the Academy is it a question?

"This aspect of the presidential Ukase is causing us, however, particularly great alarm. It is quite clear that the present leadership of the USSR Academy of Sciences, which is not noted for a progressiveness of views, is experiencing anxiety over its future in connection with the prospect of the democratic transformations that are coming from the Russian parliament. And it is entirely clear, therefore, that it would like to secure in public consciousness the inseparable connection between the Academy of Sciences proper as a public organization and the system of scientific institutions that are managed by it. And if it succeeds in this, in case of the transfer to the aegis of Russian organs of state power (that is, in case of the change of 'signs') the present stagnant leadership of the

Academy will still be just as undividedly in command of basic science. On no account must one allow the latter...."

As to the second, academic interpretation, at the rally Academician Ye.P. Chelyshev presented it. His speech reduced to the fact that academicians had not thought of taking possession of the property that had been turned over to them. Their first thought was: "Here, at last we have acquired independence. Now science will begin to live!" It will be possible without instructions from above (in spite of the fact that they were contained in the Ukase itself) to distribute fairly assets and so on and so forth. "At times they call us a ministry of science," he said, "but this is not true. We are a community of scientists!" In other words, we are good and now will do everything correctly.

The most convincing defense of the Ukase is contained, in our opinion, in the collective letter of the editorial office of PRAVDA of 26 September, which was signed by Academicians A.P. Aleksandrov, V.I. Goldanskiy, A.Yu. Ishlinskiy, V.A. Kirillin, V.N. Kudryavtsev, and R.V. Petrov. We will take the liberty to cite several of their arguments.

"For the first time," it is stated in the letter, "the Academy, which previously was subordinate to his majesty the emperor, and then was under the jurisdiction of the Council of People's Commissars (the Council of Ministers), has acquired independence.... However, our joy was darkened by the position of several, a few, people, who had a negative attitude toward this act....

"What are the arguments against the Ukase? The first and basis one is: '300 academicians will own all the property'; moreover, they will divide it among themselves and will pass it on to their heirs (!). The incredibility of these assertions can be compared only with their legal ignorance. It never occurred to the authors of the cited 'arguments,' apparently, that what is public is not personal and that each of the academicians is by no means becoming an owner of the property.

"Who in reality should be the owner of academic property? The Presidium of the USSR Academy of Sciences, when discussing this question, made the decision to delegate this right to the regional departments of the Academy and to its institutes and laboratories, that is, to those, who directly perform scientific work and actually have this property. This will make it possible to use the property more efficiently for the needs of science, without unnecessary interference of the center. Thus, not '300 academicians,' but the entire large academic system will be the owner of the property that is now in the use of the institutes and regional departments....

"The deputies of the Russian parliament state that the Ukase of the President infringes upon republic sovereignty. The assertion is a very dubious one. Indeed, "the exclusive right of the people to the possession, use, and disposal of the national wealth of Russia" is proclaimed in the Declaration on RSFSR State Sovereignty. But are the Academy of Sciences and its associates really no longer the people, no longer are a part of them? And does

the transfer of the property, which belongs to the USSR, to the ownership of institutes of the Academy violate the rights of the people? It seemed to us that this act strengthens them by many fold....

"The point is, apparently, that some interpreters of the Russian Declaration confuse sovereignty with ownership. They simply cannot give up the old, administrative command stereotypes, in conformity with which everything should belong to the state. If not the union state, then the republic state. And when the union state voluntarily gives up its property and turns it over to those, to whom it should be belong, in this case to scientists, this puts them on the spot.

"An elementary truth has to be explained: The most different owners, starting with the citizen and ending with the state (the republic and the Union), can and should function on the territory of any sovereign state. The sovereignty of the republic in this case finds expression in the fact that all these owners should observe the laws of the republic, including pay taxes. But the republic also does not have the right to interfere in civil law relations, to take away property, or to proclaim itself the owner of the property of others."

It is amazing. They tell you heaps of correct things and not one incorrect thing, but as a result black turns out to be white. When very respected, obviously intelligent, very intelligent people say words similar to those cited above, a frightening suspicion involuntarily creeps into your mind—but suppose they really think that?

What is public is not personal.... But what is it then? I, sad to say, believed that what is public is what is in the ownership of society, in this specific case the public organization, which is called the USSR Academy of Sciences and consists not of institutes, not of peoples, but precisely of these "300."

The legal competence of the authors of the letter leads, as happens in science, to a surprising paradox. It turns out, for example, that the USSR President turned the property over not to the academy, but to "the entire large academic system," that is, to institutes, laboratories, and others, but then the same Academy is once again turning the same property over to the same system by its own decision.

From the institutes of the Academy of Sciences, 96 percent of which are the national wealth of Russia and, therefore, in conformity with the Declaration are the property of the Russian people (no one, as far as I remember, disagreed with the Declaration), an all-union concern is being established—and this, it turns out, "strengthened by many fold" the rights of the people.

The already mentioned transfer of property from the Academy to the institutes also does not change too much the state of affairs. The directors of institutes, which are appointed by the same Academy and depend in everything, up to wage rates (read the Ukase), on it, will now manage it. It is difficult, very difficult not to take the side of those who assert that not "the privatization of union

property," but its decentralization is occurring, that for the present "its transfer to the hands of producers" is not in the air.

But whatever the case is there, there are two different opinions about the Ukase. Some people say that it is possible to cure the Academy from within, as soon as it frees itself from the oppression of party and state organs. Others say that "no matter how much you feed a wolf...."

If you evaluate what is happening realistically, it is difficult to believe the optimism of the academicians. The incident with the Ukase and the events that preceded it testify to one thing: They do not have faith in the Academy. As Candidate of Physical Mathematical Sciences A. Sobyenin, an RSFSR people's deputy and one of the organizers of the rally, believes, the leadership had given reason for lack of faith more than once after the death of Sakharov. Begin if only with the reelection meeting of the leadership of the Academy. In many respects by its frenzy it was reminiscent, Sobyenin believes, of the congress of Russian communists, which by that time had just concluded. The meeting began to silence and to trample in the best red-letter traditions the young Corresponding Member A. Larkin, one of the few who criticized the leadership.

Two weeks later the newly reelected president of the Academy of Sciences made the hall of the House of Scientists available for the holding of the constituent meeting of the organization which called itself the Union of Democratic Forces imeni A.D. Sakharov. It is possible to judge how democratic this organization is from the fact that these were the only "democrats" invited to the second half of the Constituent Congress of the Russian Communist Party. At the same time the Club of Voters attached to the USSR Academy of Sciences was banished from the House of Scientists.

The next action of the Academy was the nomination of USSR people's deputies for the seats of deputies who had departed, including for the seat of Andrey Dmitriyevich Sakharov. The Presidium of the Academy of Sciences also did not go against principles here. It held a narrow district meeting, where only 22 people selected the candidates. The meeting was held behind closed doors, representatives of both the press and public organizations were not admitted here. It appears, Sobyenin asserts, that many members of the Presidium were not informed about what kind of meeting it would be.

In the chain of these events it is difficult to call the appearance of the Ukase on the status of the Academy a surprise. Behind the scenes work, the complete secrecy of preparation, and the issuing of the Ukase at the time, when the majority of scientists were on vacation, are typical of the situation. And the complete silence, the complete indifference of academicians to the fortune that sudden fell upon them—independence—up to the

moment, when the application for the rally was submitted to the Oktyabrskiy Rayon Soviet Executive Committee of Moscow. Why did the "community of scientists" remain silent so long about such long-awaited, so suddenly acquired freedom? And then all at once furious activity, the invitation of the signers of the application to the party committee of the Presidium of the Academy of Sciences, as well as to a meeting with the leadership. Everything is like last year. The next day three vice presidents—Yu.V. Osipyan, V.N. Kudryavtsev, and O.M. Nefedov—set out for the institutes to explain the meaning of the presidential Ukase.

At that time the newspaper SOVETSKAYA ROSSIYA made a very interesting typographical error. Citing the statement in the RSFSR Supreme Soviet of People's Deputy A. Shabad about the forthcoming rally of 13 September, it reported that the rally had taken place on 13 August. While the administrator of affairs of the USSR Academy of Sciences called the Oktyabrskiy Rayon Soviet Executive Committee and the deputy chairman of the rayon soviet, demanding that the rally be prohibited. He had very formidable grounds: It turns out that during the last rally the demonstrators had so mutilated the lawns in front of the building of the Presidium that 10,000 rubles had to be spent on putting them in order. It would be interesting to find out: How is it possible to ruin lawns in frosty winter, what phloxes grow at the Academy of Sciences under the solid snow cover? If the reader would direct attention to the photo on the right, where that February rally is pictured, he will be able to become convinced himself of how cultured and law-abiding the people who came there were—they walked with such precision along the paths.

Many other strange events occurred. For example, on the day of the rally simultaneously at several institutes—the Institute of Scientific Information on Social Sciences, the Institute of Water Problems, and others—general assemblies with the mandatory attendance and registration of all associates were set precisely for the time of the holding of the rally. And this also became one of the reasons, for which the people, who darkened the quiet joy of academicians with their rally, were few.

It is possible, of course, to say that all the listed facts are not intentional interference, but simply unrelated events that by chance coincided in time. But it is well known that when the number of chance coincidences exceeds the critical mass, a chain reaction of distrust of chance begins in complete conformity with probability theory.

We already know how the Russian parliament reacted. Here is what Doctor of Technical Sciences A.N. Tikhonov, deputy chairman of the RSFSR State Committee for Science and the Higher School, told our correspondent Marina Lapina in this regard.

"I do not understand how the President can sign a 'decree' for the transfer of many millions of rubles of state property to any public organization whatever. In my opinion, this is legal nonsense. And since when has the USSR Council of

Ministers been charged to consider questions of increasing the wage of associates of a public organization? The substantive aspect of the document evokes no less, if not more bewilderment. The impression is created that it was drawn up in haste and was dictated by the aspiration to attach to presidential power (I no longer see to whom) such an organization as the Academy of Sciences. This does not create favorable conditions for interrelations of the republics with the center and for the normal work of academic institutions themselves.

"The establishment of a basic research fund, into which assets from the state budget will be paid, is spoken about in the Ukase. The situation, when the republics are delegating to the center rights in the settlement of state issues—defense, communications, and so forth—is now forming in the country. But there is no document which would delegate to the center the right to manage science and to finance it.

"In our opinion, an expert council of scientists, which is independent of the Academy of Sciences or any other organizations and of which representatives of the union republics will also be members, should supervise the fund. Perhaps, it is advisable to establish the Fund under the USSR Supreme Soviet. But now, when the Presidium of the USSR Academy of Sciences wants to reserve the right to distribute the assets for science, the republics, I believe, will not deduct money for such a fund. At present the drafting of the charter of the fund is being carried out by the same Presidium of the USSR Academy of Sciences. Moreover, a draft of the Charter has already been written, but thus far no one has seen it with his own eyes. They are not showing it to us, for example. But why hide it? Why not publish the draft even 'in raw form' and submit it to the scientific community for discussion?

"In connection with the appearance of the Ukase serious apprehensions concerning another thing arose for me. In our country the emigration of scientists is assuming a threatening scale. Of course, it is illegal and foolish to close the borders. A scientist has the right to work where his labor will yield the maximum return. But instead of thinking about what conditions it is necessary to create without delay for the efficient use of the scientific potential in our country, the authors of the Ukase are creating all the conditions for the stimulation of the opposite processes. Now our scientific potential, which was accumulated over decades, can be used freely for the good of any country you like, but not the Soviet Union. Here it will not be necessary even to cross the border. For the state cannot interfere in the activity of a public organization, and, hence, no one can prohibit the director of any academic institution from concluding a contract with any firm for the performance of some jobs or others.

"What, it would seem, is bad here? At first glance, nothing. But the state spent considerable assets (including foreign exchange assets) on the acquisition of expensive equipment, the construction of buildings, and the training of specialists, yet it will not get these assets back.

A public organization is not obliged at all to deduct the revenues from its activity for the state budget, it is obliged only to pay taxes."

The incident, let us repeat, is not yet over. In reality the effect of the article of the Ukase on the transfer of property has not been repealed, but has merely been suspended. It is quite likely that the affair will end in nothing, but it is also possible that this incident will have a nontrivial continuation. The future will show.

And still a question does not leave me in peace: Why, all the same, was the rally such a small one? There is the following law: When three causes are named, the main one of them is the fourth one. It is possible to say that the Ukase is not that clear and unambiguous. It is possible to defend oneself by the fact that the organizers did not have enough time for the proper organization of the rally. It is also possible to ponder in earnest over the political backwardness of the masses. But, it appears, it is a matter of something completely different. Take a look: Although the "people" were few, still they got what they wanted—the effect of the article of the Ukase was suspended. And this is not a simple matter of chance. Last year, when they defended Sakharov, they had no one to rely on except themselves, there was nothing left for them to do except to "succeed" through the mass and the voice. Now their authorized representatives—those who on 2 February of last year stood together with them in the snow before the steps of the Academy—sit in the Russian parliament, on committees, on commissions. And it is no longer the Academy that decides, but they themselves. And whereas last year's rally was an act of protest, the present one was more like an act of courtesy—"we have come to warn you: we do not agree."

Meeting of USSR AS Election Commission Erupts in Conflict

917A0033A Moscow *RADIKAL* in Russian No 1,
Oct 90 p 3

[Article: "The Election Was Unsuccessful"; first paragraph is *RADIKAL* introduction]

[Text] On 26-27 September the Academy of Science held at Moscow State University a conference, which was devoted to the election of USSR people's deputies to the seat of Andrey Dmitriyevich Sakharov, as well as Academician S. Alekseyev, who was elected to the Constitutional Oversight Committee of the USSR Electoral Commission.

To their own misfortune, of course, the "immortals" invited electors from the institutes to participate in the conference. The storm broke out already at the very start, during the discussion of the agenda. The electors proposed their own alternative agenda, in which reports of the people's deputies from the academy and the discussion of the presidential Ukase "On the Status of the USSR Academy of Sciences" were included. President of the Academy of Sciences G. Marchuk was disapproving of the alternative and only under the pressure of the electors was forced to put the question to

a vote. After the counting of the raised hands it turned out that the proposal of an alternative agenda did not win a majority of votes.

The dismayed electors, who were certain that "by eye" they had won an obvious majority, suspected a forgery and left the hall as a sign of protest. After two hours of heated debates in the vestibule, where the speakers, so that they would be seen, climbed onto the bust of Dmitriy Ivanovich Mendeleyev, the electors returned to the hall and read a quite blunt statement, in which it was stated that they were refusing to take part in the further work of the conference. And then the alternative agenda was adopted.

A separate article should be devoted to the report of the deputies (V. Ginzburg, G. Arbatov, and V. Platonov) and to the discussion of the presidential Ukase. Let us merely note that with respect to the Ukase the matter moved in the direction of a consensus: After Russian Soviet Federated Socialist Republic (RSFSR) Deputy A. Shabad, an opponent of the Ukase, said that the scientific community would accept it, provided the property being transferred would actually belong to everyone, and not to the directors of institutes, who were appointed by the Academy, G. Marchuk noted that this was a constructive proposal.

But as regards the election nothing came of it. Angered by the behavior of the presidium of the conference, the electors decided to cross out everyone, although before the start of the conference they were in a more peaceable frame of mind and this suggestion did not arouse anyone's enthusiasm. As it turned out subsequently, it was not necessary to cross out everyone: Very few academicians came to the conference and a quorum did not assemble for the vote. They believe that a second election conference will hardly take place: Once again it is unknown how it would end, and this measure costs the Academy a large sum of money—120,000 rubles.

In the opinion of Deputy Obolenskiy, who spoke at the conference, the nonelection of deputies is the best way out of the situation. He had previously also proposed not to elect new people's deputies to the seats of the people's deputies from the Academy, who had left, and to suggest to other public organizations to do likewise.

Scientists Organizations Hope To Reorganize USSR Academy of Sciences

917A0046A Moscow *RADIKAL* in Russian No 2, Oct 90 p 3

[Interview with L. Vakhnina, cochairman of the Club of Voters attached to the USSR Academy of Sciences, by Viktor Kamnev; date and place not given: "And Is the 'Big' Academy Also in Favor?"—first paragraph is *RADIKAL* introduction]

[Text] During the first half of next year it is planned to hold the Congress of Scientists. Its initiators are the Club of Voters attached to the USSR Academy of Sciences

and regional unions of scientists. Representatives of what is called "the big Union"—the USSR Union of Sciences—are also on the already elected organizing committee. As L. Vakhnina, cochairman of the Club of Voters attached to the USSR Academy of Sciences, reported, it is anticipated that representatives of all regions of the country will gather at the congress.

[Vakhnina] The talk about the necessity of such a congress, L. Vakhnina said, has been going on for a long time. The existing system of the management of domestic science, when the Presidium of the USSR Academy of Sciences in practically a monopolistic manner manages the financing of research, specifies the priority of scientific directions, and so on, absolutely does not suit scientific personnel. They spoke about a congress of scientists back at the beginning of last year, during the election campaign. At that time the executives of the academy spoke in favor of radical changes. It was said that scientific personnel should take part in the management of science, words about a bicameral academic system were spoken, there were other, entirely reasonable suggestions. Nearly two years have passed, but these words simply remained words—the Presidium of the USSR Academy of Sciences has done absolutely nothing in this direction.

The Ukase of the USSR President "On the Status of the USSR Academy of Sciences" rocked the scientific community. It showed that it is necessary to proceed from talk about a congress to its quickest convening. Under the existing Charter of the USSR Academy of Sciences the Presidential Ukase will place scientific personnel in a completely intolerable, feudally subordinate position. Consequently, it is necessary either to amend the Charter or to repeal the Charter. Now the effect of the Charter, as is known, has been partly suspended. The Congress will decide what to do next. But before the congress, we believe, the Presidium should express its opinion in this regard. In particular, as the initiators of the Congress of Scientists stated, it is necessary together with representatives of the scientific community to review the Charter of the Academy of Sciences and to return to it the former, pre-1959 wording, which includes in the membership of the academy along with its members the associates of academic institutions. It is also necessary, in our opinion, to develop a mechanism of the participation of elected representatives of scientific collectives in the management of academic science at all levels and in its financing.

[Kamnev] And what does the Presidium of the academy think of the idea of a congress?

[Vakhnina] Now the members of the Presidium are talking about cooperation. They want together with us to change the formed state of affairs. Time will show to what extent their intentions coincide with ours and how ready they are for radical (and not cosmetic) changes. We are already now actively cooperating with them, it would

suit us entirely if the academy would contribute to the implementation of the decisions that the future congress will make.

[Kamnev] Does it not disturb you that the Presidential Ukase was received with enthusiasm not only by the conservative part of the academic leadership, but also by popular academicians and great scientists, whom it is difficult to suspect of bureaucratic intrigues, whose sincerity and decency are not subject to any doubt, and whose progressive views are widely known?

[Vakhnina] Yes, indeed, many of them are completely loyal to the Ukase. They believe that the Ukase frees scientists from the tutelage of the state and the CPSU Central Committee and, therefore, it is incorrect to say anything against it. A different view of the world is probably developing among those who are close to the leadership. One's position has a very strong influence on a person and on his views, hardly anyone can withstand this influence.

An extreme expression of such a point of view is the statement of G. Marchuk that "the academy is academicians, corresponding members, and the institutes that serve them." If I had not heard it myself, I would never have believed it. He said this so sincerely that he did not even understand how absurdly his words were perceived by the audience.

Even the best of the academicians partially support this opinion. They are an association of scientists, flesh of the flesh of the scientific community, and not an administrative, oppressive structure, and since they have transferred the property to them, they simply cannot manage it to the detriment of science. It is not sinking into their head that the academy cannot govern if only because it lost long ago the trust of scientists—precisely the academy as a structure, and not the academicians, many of whom we love.

MNTK "Machine Reliability" Outlines Successes

917A0041A Moscow VESTNIK

MASHINOSTROVENIYA in Russian No 9.

Sep 90 pp 3-6

[Article by Vice President of the USSR Academy of Sciences Academician K. V. Frolov: "The Nadezhnost mashin Interbranch Scientific Technical Complex: The Problems and Prospects of the Integration of Science and Production"]

[Text] The search for means of improving the management of scientific and technical progress (NTP) led to the idea of the establishment in December 1985 of interbranch scientific technical complexes (MNTK's), which are called upon to accomplish the integration of science and production and to coordinate the activity and combine the efforts of organizations and enterprises of various departments, academic scientific institutions, sectorial scientific research institutes and design bureaus, enterprises and associations of industry, and higher educational institutions.

At present 23 interbranch scientific technical complexes, to which in 1988 and 1989, for example, respectively 504 million rubles and 682 million rubles, including respectively 265.8 million rubles and 420 million rubles from the state budget, were allocated for the performance of research and development, are operating in the country. The complexes in conformity with unified plans of research, development, and experimental work developed about 750 new types of equipment, technologies, and materials; of them more than 100 have been introduced, about 150 are being produced in small series or are being assimilated in production, the rest have been prepared for introduction in production.

According to the data of the USSR State Committee for Statistics, 95 percent of the state order for the delivery of fundamentally new equipment and materials, which was accepted by enterprises and organizations for January-September 1989, was fulfilled with respect to the national economy as a whole, including those developed in conformity with scientific and technical goal programs—92 percent and the plans of interbranch scientific technical complexes—100 percent. Approximately a third of the developments of interbranch scientific technical complexes do not have analogs and conform to the most advanced technical level.

In the system of established interbranch scientific technical complexes great importance is being attached to the complexes that are called upon to ensure the acceleration of scientific and technical progress in machine building. These are the Institut elektrosvarki imeni Ye.O. Patona, Nadezhnost mashin, Poroshkovaya metallurgiya, Rotor, Termosintez, Metallurgmash, Robot, and other interbranch scientific technical complexes. Now it is possible to state that the period of the formation of these interbranch scientific technical complexes is over and from the majority of them there is a specific return that is making it possible to accomplish breakthroughs in a number of most important directions of the development of science and technology.

In connection with the fact that the Nadezhnost mashin Interbranch Scientific Technical Complex is working on urgent problems and tasks of increasing the technical level, quality, and reliability of the most important products of machine building, it is expedient to examine in greater detail the results of its activity, which is being carried out on the basis of an interdepartmental, state-wide approach to the achievement of the set goals.

The activity of the complex is aimed, first of all, at the elaboration of the basic problems of the assurance of the reliability of machines, as well as at the development, the organization of the production, and the introduction of diagnostic and test equipment, the drafting of standard technical documents and the improvement of standardization in the area of reliability, and at the training and the increase of the skills of specialists in the diagnosis and inspection of machines and components, as well as in technological methods of the assurance of reliability.

In recent years about 30 percent of the total amount of test and diagnostic equipment was produced by enterprises and associations of the complex in accordance with new developments of the Nadezhnost mashin Interbranch Scientific Technical Complex.

The experience of operation showed that the establishment of the interbranch scientific technical complex contributed to the shortening of the time of the development and the introduction in production of achievements of science and technology, as well as to the formulation of a unified science and technology policy in the area of the assurance of the reliability of machines and components and to the development of new diagnostic and test equipment, which in technical level approaches the best world models.

The work within the framework of the activity of the Nadezhnost mashin Interbranch Scientific Technical Complex was developed on the basis of the concept of an intersectorial and interdisciplinary systems approach to the assurance of the reliability of machines at all the stages of their life cycle. The development of standard technical regulatory documents and methods, means, and systems of analyses and simulation with the development and use in scientifically substantiated amounts and at scientifically substantiated levels of diagnostic and test equipment is efficiently combined in the indicated approach.

Under the supervision of Corresponding Member of the USSR Academy of Sciences V. V. Bolotin, deputy general director of the interbranch scientific technical complex, a large amount of work was performed on the improvement of standard technical documents in the area of equipment reliability. In the proposed drafts of new standards definitions, which do not have strict scientific substantiation, as well as formulas, which allow different interpretation, were eliminated. Here, what is very important, a set of concepts, which provide for the protection of the interests of the consumer, was introduced, and a list of basic steps on the assurance of reliability and of the methods of tests for reliability was also given. A classification of failures by consequences was proposed, which is very necessary for a sound approach to the standardization of reliability.

The proposals of the interbranch scientific technical complex in this direction were supported by the most advanced sectors of industry. It is clear that, without having developed standards of a new generation and without having come to an agreement on the basic terms and definitions, it is impossible to formulate properly a unified science and technology policy in the area of the assurance of the reliability of machines.

The Start-2 software-hardware complex for the analysis of the high-speed and random dynamic processes, which take place in highly loaded machine building components, was developed and introduced in various sectors of the national economy for the carrying out of analyses, the simulation, and the control of tests of machine building items for reliability and strength.

The Mars-2 analysis system for the comprehensive analysis of the strength of components at the stages of design, testing, operational development, and use and the Fiting software package for the determination of the local and general stress-strain state of parts of machines of complex form are of considerable interest for extensive use in many sectors of the national economy. These packages, which were initially developed as applied to very critical components, now under the conditions of the conversion of defense sectors should become accessible to civilian machine building, which is called upon to solve the most urgent problems of socioeconomic development.

In the plans of the Nadezhnost mashin Interbranch Scientific Technical Complex considerable attention is devoted to the series production of diagnostic aids, which the national economy urgently needs. At present the needs of industrial and scientific research organizations for the most part are being met by strain measurement aids, which are series produced by enterprises of the Nadezhnost mashin Interbranch Scientific Technical Complex and are necessary for the operational development and checking of the state of critical elements of components. Thus, the Veda Production Association (Kiev) annually produces 1.3 million foil resistance strain gauges; the Tenzopribor Plant (Krasnodar) produces resistance strain gauges for the measurement of strains at temperatures from 20 to 450 degrees Celsius. The production of self-temperature-compensating resistance strain gauges, which can be welded on, for the measurement of strains over the temperature range of 70 to 200 degrees Celsius, resistance strain gauges for the measurement of elastoplastic deformations, as well as special resistance strain gauges for high working temperatures is being assimilated. Moreover, the production of a range of resistance strain gauges for the measurement of deformations in the temperature range from -269 to 500 degrees Celsius will be assimilated at the Tenzopribor Plant. Models of new strain measurement equipment are being developed for series production.

For the first time in the USSR the Central Aerohydrodynamics Institute jointly with the Veda Production Association developed and prepared for series production sensors for the recording of the development of surface cracks, which conform to the highest world achievements and have been patented in the United States, Japan, the FRG, and France. Thus, a license for the technology of producing the sensors, as well as software for measurements and the processing of the results were sold to Japan. A license for strain gauges for measurements at elevated (up to 400 degrees Celsius) temperatures was sold to the Czechoslovak Skoda concern. Preparation for the production of high-temperature resistance strain gauges is being carried out at the Kaliber Plant (the Republic of Hungary). The series production of new highly sensitive transducers for the evaluation of the vibration characteristics of equipment in accordance with the basic parameters is being assimilated at the Moscow Spektr Scientific Production Association. The production of portable vibration diagnostic

and monitoring and alarm equipment, the use of which promotes the assurance of the safe operation of critical assemblies, has been set up. The series production of noise and vibration meters and vibration tables is being carried out. New methods, means, and systems of the diagnosis of automated works are being developed, highly efficient systems of the passive and active vibration protection of critical components are being devised, the technical parameters and ergonomic characteristics of machines are being improved significantly.

The series production of advanced types of products—automated electrohydraulic systems—was set up within the framework of the activity of the Nadezhnost mashin Interbranch Scientific Technical Complex for the purpose of overcoming the lag in the development and production of machines and devices for the determination of the mechanical properties of materials, as well as benches for tests of full-scale elements of components and items of machine building in modes that are as close as possible to actual operating conditions.

Under the scientific methods supervision of the interbranch scientific technical complex the efforts of academic and higher educational institution (VUZ) science, as well as enterprises and organizations of civilian machine building and defense sectors were combined for the purpose of developing advanced equipment for cyclic tests with control and the processing of the results on computer. The enterprises of the Nadezhnost mashin Interbranch Scientific Technical Complex for the first time in the USSR set up the series production of multichannel electrohydraulic stands. The electrohydraulic stands, which were produced by the Avtopromispytaniya Scientific Production Association (Gorkiy), were delivered to a number of large enterprises of the machine building complex and make it possible to conduct tests of both individual assemblies and elements of components and complete items as a whole.

The assimilation of the production of domestic multichannel electrohydraulic stands will make it possible to reduce, and in the future to completely abandon purchases of the corresponding equipment abroad (the volume of purchases in the United States, the FRG, and Great Britain in recent times came to approximately 50-57 million foreign exchange rubles annually).

On the basis of a multilateral contract between organizations of the USSR, the Czech and Slovak Federal Republic, the GDR, and Bulgaria the Nadezhnost mashin Interbranch Scientific Technical Complex is performing work on the development of testing systems (machines and multichannel stands) on the basis of the best modules and blocks, which are being developed in these countries with allowance made for world experience.

In accordance with developments of the interbranch scientific technical complex thus far about 350 sets of machines for rapid friction engineering tests have been produced and delivered to the national economy. Promising automated friction engineering test complexes with control and data processing on computer, which do not

have world analogs, were developed and are being prepared for series production. Not less than 25-30 such complexes, in which organizations of the USSR and other countries are interested, will be produced annually.

The set of high-class X-ray equipment, which was developed by organizations of the Nadezhnost mashin Interbranch Scientific Technical Complex (the State Scientific Research Institute of Machine Science, the Moscow Spektr Scientific Production Association, the Leningrad Burevestnik Scientific Production Association, and others), is affording great opportunities for the diagnosis and testing of materials and elements of components. The Leningrad Burevestnik Scientific Production Association and the Moscow Spektr Scientific Production Association are producing specialized X-ray equipment for nondestructive testing and research, as well as equipment that is being exported abroad. The Mir-4 portable X-ray microscope, which was developed in accordance with plans of the interbranch scientific technical complex, corresponds to the highest technical level and does not have foreign analogs. The production of the MID-2 specialized diffractometer, which corresponds to the best foreign analogs and makes it possible to shorten by tens of fold the time of the X-ray analysis of a material, is being assimilated.

Developments, which are aimed at the improvement of the utilization ratio of metal and significant resource saving and are based on achievements of basic science and the experience of advanced sectors (working under the conditions of superplasticity, the high-temperature gas-static working of cast parts, local thermomechanical hardening actions, the application of coatings by ion-plasma, laser, and other means), were implemented in the area of the development and introduction of new materials and technologies.

The integrated, systems approach to the assurance of the reliability of machines at all stages of their life cycle, which is being developed by the Nadezhnost mashin Interbranch Scientific Technical Complex, is making it possible owing to the coordination of the work and the combining of the efforts of academic institutes and head organizations of the sectors of industry to accomplish difficult tasks in the area of the increase of the technical level, as well as the evaluation of the technical state and the monitoring and extension of the life of machines. Thus, for example, within the framework of the assignments of the unified plan of the Nadezhnost mashin Interbranch Scientific Technical Complex methods of evaluating and extending the life of thermal power engineering equipment, which are yielding a large national economic impact, were developed at the TsKTI Scientific Production Association (Leningrad). These developments are already now being used extensively in practice and are yielding a saving of many millions of rubles. Foreign firms are also interested in their use.

Within the framework of the activity of the complex there have been formed: the Ukrainian and Belorussian regional centers of the Nadezhnost mashin Interbranch Scientific

Technical Complex, the Ural Reliability and Life of Large Machine Systems Engineering Center, the Scientific Engineering Center for the Problem of the Reliability and Life of Power Equipment (Leningrad), the Cost Accounting Test Center for the Strength and Life of Machines and Components (Krasnoyarsk), as well as two educational research centers in Moscow: for the diagnosis and testing of components, items, and systems of their production and for the reliability of equipment of the motor transport complex. There have been established: the Special Design Bureau for Means of Strain Measurement (Krasnodar), problem laboratories for questions of the control and reliability of electrohydraulic systems in Kharkov and Armavir, as well as the reliability department at the NAMI Scientific Production Association.

As a whole the increase of the output volumes of diagnostic and testing aids with the increase in them of the share of new equipment, which is being devised in accordance with developments of the interbranch scientific technical complex, is providing the conditions for the accomplishment of the assignments that were specified by the decree of the USSR Council of Ministers "On Measures on the Support of the Multibranch Scientific Technical Complex" of 5 March 1987, in which the raising of the annual output volume of these products by 1990 to 106.5 million rubles is envisaged.

At the same time the radical economic reform and the reorganization of ministries and departments require the shifting of the center of gravity of the organizational activity of the interbranch scientific technical complex to the establishment of voluntary associations for the development and production of diagnostic and testing aids, state-cooperative associations, and other formations. It should be noted that, in spite of the efforts now being made, without the search for new solutions it is impossible to count on a radical change of the state of affairs in the country with testing equipment, only 40-50 percent of the need for which is currently being met.

Due to the weak material base of industry, the slow technical reequipment of operating enterprises, and the lack of reserves of production capacities the pace of the introduction of promising developments of the Nadezhnost mashin Interbranch Scientific Technical Complex is still inadequate. Under the conditions of cost accounting individual enterprises of industry have sharply reduced the amount of financing of research and development, including the research and development being performed in accordance with the plans of the interbranch scientific technical complex. The inefficient use of the production potential is occurring—many specialized enterprises of the complex are overloaded with the production of noncharacteristic products. For the enterprises of the interbranch scientific technical complex, which are engaged in the introduction of the most important developments of the complex, the principle of priority supply with materials and components of the necessary quality is not being implemented in practice. Therefore, the technical level of the products being produced lags behind the world level in the area of the provision of testing machines with new contactless means of

measurement and computer systems with the appropriate set of programs, the use of means of self-diagnosis, systems of the automatic loading, measurement, and representation of information, and metrological characteristics which influence the reliability of test results.

Under the formed conditions as one of the essential directions of the work on the expansion of the production of means of diagnosis and testing it is planned to include in the Nadezhnost mashin Interbranch Scientific Technical Complex a number of new scientific research and industrial associations and to remove from the complex weak enterprises and organizations, which do not have the necessary scientific, technical, and production potential.

The involvement in the activity of the Nadezhnost mashin Interbranch Scientific Technical Complex of organizations and enterprises of the defense sectors of industry, which have much experience of work on the assurance of the reliability of items and under the conditions of conversion should be economically interested in the transfer of developments for implementation in the national economy, is acquiring great importance here. However, the participation of organizations and enterprises of the defense complex in the unified plans of the interbranch scientific technical complex should receive the appropriate legal and economic basis. In practice the problems of conversion proved to be far more complex than they seemed at first.

The deficiency in the supply of enterprises and organizations of the machine building complex with the necessary diagnostic and testing equipment, as the experience of the activity of the Nadezhnost mashin Interbranch Scientific Technical Complex shows, to a certain extent can be offset by the making of new economic organizational and scientific and technical decisions. These are, first, the establishment of interbranch regional cost accounting centers for automated strength studies and tests, which are supplied with a complete set of the necessary equipment; second, the development of the activity of the Center of Mathematical and Physical Simulation in Machine Building on the basis of the head organization of the Nadezhnost mashin Interbranch Scientific Technical Complex and a system of regional centers for software and the fulfillment of computer experiments in accordance with direct orders of industry; third, the development, devising, production, making up of complete sets, delivery, and series servicing of a set of equipment for standard centers of the operational development, diagnosis, and testing of machines, which have been organized on a cooperative basis with interested foreign organs.

The indicated directions are being implemented while formulating the plans of the activity of the Nadezhnost mashin Interbranch Scientific Technical Complex for 1991 and the future, including on the basis of the international Association being established, in which such organizations as the Moscow Spektr Scientific Production Association, the Central Aerohydrodynamics Institute, the Gorkiy Affiliate of the All-Union Scientific

Research Institute for Normalization in Machine Building, the KamAZ Production Association, the Institute of Problems of the Reliability and Durability of Machines of the Belorussian SSR Academy of Sciences, the Temp Interbranch State Association (the USSR), as well as the Inova firm, organizations of the State Research Institute for Machine Building and the Aeronautical Research and Testing Institute, the Electrical and Fuel Equipment Plant (the Czech and Slovak Federal Republic), the SIME firm, the Khidravlika Economic Trust, the Institute of Microprocessor Technology (Bulgaria), and the UniPAN Plant and the Institute for Basic Technical Problems of the Polish Academy of Sciences (Poland). Such activity seems to the interbranch scientific technical complex to be one of the forms, which make it possible to develop systematically the work on the transfer of the gained experience of defense sectors to organizations of the machine building complex. This should contribute to the increase at scientific research institutes and design bureaus of civil machine building of the standards of design and the scientific and technical level of analyses, to the development of work on the analysis of the real stress loading and the determination of the local and general stress-strain state in parts of complicated form, and, in the end, to the assurance of reliability already at the stages of design, including owing to the increase of the share of work on mathematical and physical simulation.

Thus, it is proposed to use the experience of the aviation industry more actively in the future in the automotive industry, agricultural machine building, construction and road machine building, and others. In particular, work has been started on the analysis of the peculiarities and the efficiency of the use in mobile machines of on board indicators of the useful life, which successfully proved themselves during the operation of aircraft. Sensors for the recording of the development of surface cracks, which are being assimilated by series production, as well as transducers for the evaluation of the vibration characteristics of equipment, portable vibration diagnosis and control and warning equipment, noise and vibration gauges, and benches for vibration tests should receive extensive use.

In the future on the basis of the integration of science and production within the framework of the activity of the interbranch scientific technical complex it is proposed to increase the number of fundamentally new developments with an outlet to series production, for example, in the area of new detectors, which convert various physical fields into electricity, including on the basis of electrodynamics, semiconductors, or molecular electronics. The use of sensor systems in principle might make it possible to develop new diagnostic means, for which within the framework of the conversion of the defense industry it is necessary on a competitive basis to enlist new organizations and enterprises in the solution of the problems and the accomplishment of the tasks, which face the interbranch scientific technical complex. Here it is necessary to specify the legal status and to

strengthen the economic base of the interbranch scientific technical complex as an organ, through which the mechanism of the state support of innovations, without which the acceleration of scientific and technical progress is impossible, can be effectively implemented.

It is necessary to intensify the work on the participation of the interbranch scientific technical complex in the international division of labor. Now scientific and technical cooperation with a number of countries is being developed on a mutually advantageous basis. The Institute of Machine Science of the USSR Academy of Sciences is the head organization for the fulfillment of the major project "The Center of Automated Tests and Technical Diagnosis," in the implementation of which many organizations both in the USSR and abroad are interested. Joint scientific collectives and ventures are being established. A search for new flexible organizational forms is being conducted. Thus, at the State Scientific Research Institute of Machine Science a temporary special-purpose scientific collective has been set up, contractual relations are being established with scientific centers of the republics, a contract with Bulgaria for the delivery of a large batch of personal computers like the Pravets-16 has been concluded and is being implemented. Joint work is being conducted with the State Technical Scientific Research Center and firms of Finland, including on a contractual basis.

The Moscow State Technical School imeni N.E. Bauman as a member of the interbranch scientific technical complex performed much work on the output within the framework of conversion of the Avtokon-1 and Avtokon-2 automated nondestructive testers, as well as took a number of organizational steps for the production of means of nondestructive testing jointly with the Nuchem firm (the FRG) and the Sonotest firm (Great Britain). Acoustical systems of the monitoring of power equipment were produced and supplied for the nuclear power plant in Paks (the Republic of Hungary). A joint Soviet-Bulgarian venture is being organized on the territory of the USSR for the production of equipment for nondestructive testing. Such organizations of the Nadezhnost mashin Interbranch Scientific Technical Complex as the Moscow Spektr Scientific Production Association, the Institute of Problems of the Reliability and Durability of Machines of the Belorussian SSR Academy of Sciences, and others are also actively developing joint work with foreign firms.

The advanced training of personnel in the specialty "Nondestructive Methods of Testing and Diagnosis" (on the basis of the Moscow State Technical School) and in the specialty "The Technological Assurance of Reliability" (on the basis of the Moscow Aviation Technological Institute) is being carried out through the educational research centers of the interbranch scientific technical complex. It is proposed to carry out the further development of the work in accordance with the unified plans of the interbranch scientific technical complex with allowance made for the priority tasks facing the industrial regions and with allowance made for local conditions

and statewide interests. In particular, the Ukrainian Regional Center of the Nadezhnost mashin Interbranch Scientific Technical Complex is already now focusing its activity on the following most important directions which are directly connected with the assurance of the safe operation of equipment at the most critical facilities:

the development of means of testing of the strength and useful life of materials and structural components under extreme conditions with the computer-based automation of the control of the modes of loading and the processing of results;

the development of primary transducers and automated strain measuring equipment for studies of the strains and temperatures in elements of machines and components;

the development of means of vibration diagnosis and the assurance of vibration reliability;

the drafting of standard technical specifications for methods and means of the assurance of reliability according to the criteria of the strength and durability of materials and structural components, which operate under extreme conditions;

the making of a technical examination according to the criterion of strength of machines being newly developed for the purpose of the optimization of their reliability and specific consumption of materials.

Taking into account the urgency of ecological problems in the country, the Nadezhnost mashin Interbranch Scientific Technical Complex and its regional centers and base enterprises (associations) in cooperation with other interbranch scientific technical complexes, interbranch state associations, associations, and scientific and technical centers of youth should step up the work on the development of means of environmental monitoring, which the national economy now lacks so much (the checking of the composition of the air, the moisture content of soil, and the presence in them of heavy metals, the checking of the content of nitrates in food products, the diagnosis of the technical state of supply lines of gas, liquid fuel, and heat supply facilities, and so on). Considerable attention should be devoted to the development of space monitoring. The most important developments of means of ecological monitoring with allowance made for the experience, which has already been gained at such organizations as the Moscow Spektr Scientific Production Association, the Kvantemp Interbranch State Association, the Moscow Engineering Physics Institute, and others, can obtain rapid practical application in case of the appropriate state support, the coordination of operations, and the combining of the efforts of various departments.

This has a direct bearing on the assurance of the effective protection of man and his habitat against the negative consequences of scientific and technical progress, which, however paradoxical, can be ensured by the acceleration of the pace of scientific and technical progress and first of all in machine building and instrument making.

For the new economic organizational forms of the integration of science and production, such as interbranch scientific technical complexes are, as well as for the entire economy under the conditions of the effect of the new economic mechanism, the principles of voluntary associations: diversity (the formation of technology parks, technopolises, holding companies, flexible mobile collaborations, and so forth) and multiplicity, should be applied and, wherever this is expedient, the joint stock right, which is secured by law, should be used.

This will make it possible on the basis of the experience of the activity of the interbranch scientific technical complex to switch from rigid, unwieldy structures, which were initially established by the administrative command method, to fundamentally new flexible and mobile formations, which are capable under the conditions of a controlled market economy of performing efficiently the entire cycle of operations in accordance with the science-technology-production scheme.

Academy's Institutes Unchanged Despite Gorbachev Decree

917A0005A Moscow POISK in Russian No 37 (72), 14-20 Sep 90 pp 4-5

[Article by Georgiy Lakhtin, doctor of economic sciences: "Continued Discussion of the Status of Scientific Research Institutes"]

[Text] In a period of radical transformations, we are glimpsing the outlines of the future with alarm: what will happen to us, to our places of work? What, for instance, awaits the scientific research institute as a form for organization of scientific labor?

Two documents appeared this year. The draft of the Basic Principles for Organization and Activity of Scientific Research Institutes of the USSR Academy of Sciences, published in POISK (No 14, 1990), begins with the statement: "The institute... is the basic organizational link of scientific research activity." The concept, accepted by the All-Union Conference on Managing Scientific and Technical Progress in February 1990, reads: "The basic link in science should be the research collective, working according to contract on a specific problem, and not the institute." As we can see, these are two fundamentally different positions. The root of all the problems lies in their difference.

The first scientific research institutes appeared in our country in the first years of Soviet power. The poverty in everything—cadres, equipment, materials—forced us to concentrate scant resources. With the help of the scientific research institute, it became possible to gather together somewhat competent people and set a common task for them. However, the scientific research institute is not only a method of organization, but also a method of management. Or rather, a method for making science manageable.

Gradually, the numerous individual institutes were transformed into an orderly network, being in turn a component

part of the centralized, administratively managed system. The institutes themselves grew up, their subject matter "crept" in many directions, and a hierarchical internal structure took shape and became permanent. It took shape as though it were an enterprise with a technological cycle, regularly releasing its production—scientific reports, works, etc.—to the outside world.

If we turn to the draft published in POISK, the future promises no fundamental changes at all: there are the same rights and responsibilities, the same internal structure of the institute (let us stipulate, academic), except that the director will be elected, not appointed. What is so bad about the structure that has remained standing? What is bad is that it bears the "mark of Cain" of the administrative system, in whose lap it was raised and became fixed.

He who "does science" is alienated from power: he does not make decisions about hiring, acquisition of instruments, or compensation. The draft plans of academic scientific research institutes are worked out "taking into account the decisions of the departments" and are approved by Academy of Sciences departments, i.e., the main content of activity is entirely determined by a higher authority. This authority, in turn, listens to its own leader. The scientific research institute, as well as its associates, ends up being a cog in the hierarchical machine.

On the other hand, the researcher is alienated from the results of his work. He does not have ownership rights over his own intellectual output and cannot utilize its fruits. This is especially obvious in terms of inventions. Made within the walls of an institute, an invention acquires official status. The inventor is deprived of opportunities to organize his work on the basis of his own idea, to become an entrepreneur, exploiting the discovery to enrich himself and, at the same, to make a contribution to progress, which is advantageous for all society. The strongest incentives end up being excluded.

Whereas the content of activity is predetermined by approved plans, the responsibility is put on the institute—by no means for creative flights of imagination, but for the fulfillment of plans. An individual works for the indicator, assigned to the organization. Under such conditions, official growth occurs more successfully when moving along well-traveled paths, at the same time that the advancement of nontrivial ideas is for the most part punished.

Here, some might object: there is democracy, there are scientific councils which consider the plans, cadres, and other issues. Indeed, there are, but under stable organizational conditions democracy turns into gerontocracy. New ideas and initiative-minded proposals are suppressed by venerable scientists with their excessive influence.

These are only a few shortcomings related to the current status of the academic scientific research institute, but there are enough of them to think about changing the existing situation. Right now, there are more than enough critics and far fewer constructive proposals. The

present-day scientific research institute is far from the ideal. Nevertheless, we must strive for it, on the one hand trying to retain the advantages inherent in the institute (concentration of significant potential, possibility for a good supply of scientific services—from the repair of instruments to patent searches), and on the other, trying to avoid the shortcomings generated by the hypertrophy of the administrative principle.

The recent USSR Presidential Ukase, "On the Status of the USSR Academy of Sciences," predetermined a new procedure for financing basic research. Its basis is the formation of a Union-wide fund, the resources of which will be formed from state budget allocations. Individual commodity producers are not interested in the development of basic science, but society on the whole is. Therefore, decisions about the amounts of financing should be made at the highest level of state power.

The fund administration, apparently, ought to consist of working bodies of the expert council type, which will begin to receive proposals on the conduct of basic research work; these will at the same time serve as requests for financing. In this regard, competition among the petitioners is inevitable. However, it is important that the judges be not administrators, but scientists.

Here, a possibility opens up for making the primary research collective the basic organizational unit. For this, it should possess independence in choosing the subject of its activity, it should have a leader who makes decisions on the content and methods of work, and, finally, it should be the object of financing. Those who aspire to receive money from the fund should be not institutes, but the researchers directly.

These could be both organizational cells (for instance, theme groups), as well as individual scientists, both the executors of themes already being implemented, as well as initiators of new ones. Each competitor receives the right to submit proposals to the appropriate expert body, bypassing the board of directors of his institute and his scientific council. This will make it possible to preserve points of growth. The expert council, having examined the request and everything speaking in its favor (or against it), will make a decision on the expediency of allocating funds. Thus, thematic planning is linked to financing. Today, the theme is established, and then the money is sought; here, the allocation of money also signifies the inclusion of the theme in the plan. This also questions the preservation in the plan of outdated themes, carried over from year to year and of interest only to those implementing them.

Such a procedure does not mean preference for petty themes, fulfilled by a group of researchers or even individually. It can include comprehensive programs, the implementation of which requires the coordinated activity of a number of organizations. The difference in this case is that the source of money for the program participants will be not a general fund, but a programmatic fund.

Hence, the main point. Let us imagine that the money is transferred not to the institute director, but to the petitioner—the leader of the theme and, consequently, also of the thematic collective, to his subaccount. Only under this condition can we implement the long-ago proclaimed principle of theme-money, which still remains on paper. Otherwise, the institute will be financed as before, and the collectives will have to get money from the common pot. The leader of the theme will organize its fulfillment with the money received.

However, in this regard the institute will not disappear. It will become a base, providing everything necessary for the fulfillment of work: the technical equipment and services of various shops and studios. It would be wasteful and foolish to maintain an instrument specialist, patent specialist, and so forth in the thematic group. It would be just as wasteful to transfer an expensive instrument or computer into the hands of one of the groups, having shut off access for the others. This also relates to the maintenance and use of buildings and material supplies. Everything that is considered an overhead expense reaches the researchers through the institute, but, of course, not for free. The institute leadership will be related to the leaders of the thematic groups through contractual cost-accounting relations. The institute will not finance its subdivisions, as it does now. Instead, the research "teams" will maintain the institute at the expense of their own deductions.

The institute's role cannot be limited to the material side. Along with the commodity market, a labor market will appear, including for scientific labor. Let us assume that the proposal submitted by the initiative group was not accepted. Or, a theme that had been carried over is deemed unpromising and continued financing for it is denied. What will the scientific associates do? In such cases, the institute as a solid base can help them stay afloat until new work appears. As a part of the market, the institute has chances to possess a cadre reserve, from which the leaders of themes will be able to choose associates for the collectives being formed.

We should not overlook an aspect, such as the concentration of specialists of various types in large institutes. They contribute to the comprehensive development of the tasks being solved, as well as to interdisciplinary contacts and the birth of new ideas. An institute of the new type will be interested in having highly skilled mathematicians, economists and ecologists "in general use," not giving them to the thematic collectives.

Now, the status of the institute director will be different. At first, the director was primarily a scientific leader, the ideological chief. He was a figure personifying the organization (V.G. Khlopin's institute, N.Ye. Zhukovskiy's institute...). With the growth of the institutes, the scattering of their subject matter, and the increased regulation of their activity, one-man ideological leadership became impossible. In an institute numbering several thousand people, the director at best knows that certain projects are being conducted here (or maybe he does not know). Having lost the

leadership of the content-related side, he heads the organizational side. All his efforts are aimed at maintaining the stability of his organization. The obligation of the director, as written in the academic statutes, to conduct his own scientific work and have his own laboratory only underscores his administrative essence.

In the new type of institute, the director should also be only an administrator in the best sense of the word. His chief concern is to create the best conditions for performing research and to satisfy the needs of the theme leaders without infringing on their independence. The associates will get their salaries from the institute's accounts, but they will only receive as much as their theme leadership designates.

Arguments about how to elect the director—through the efforts of the scientific council, the labor collective, or some other way—will also disappear. The usual procedure for an economic leader will apply. As far as the true scientific leader who heads the thematic collective is concerned, the associates should not elect him, but he, them. He was made a scientific leader by God, not as a result of elections. It is hard to imagine a situation more foolish than, for instance, the election of I. Pavlov or E. Rutherford to the office of laboratory chief by their own students.

So that the leader will be able to choose his associates, a contract system of labor relations is necessary. This concept includes a whole range of variants, differing in methods for payment of labor, rights of the parties in terms of using the research results, and other elements. They have one thing in common: the leader is the primary link, being in charge of distributing the allocated money. He becomes the work-giver, responsible for providing work as stipulated in the contract. He also determines the amount of compensation. Moreover, he has the right to dismiss an employee, since the real value of the latter is only revealed in the course of work.

The need for certification, long since deformed into a bureaucratic formality, will decline. In the final account, only he who either has displayed his scientific initiative, having received recognition and financing, or who has contracted to participate in the work being headed by someone, will work in science. The contracting system will make it possible to select associates most appropriate for the task at hand, instead of pursuing jobs for the staff already existing.

Now, let us return to the beginning, where two alternative positions were noted. One of them, relying on the unshakable status of the scientific research institute, conforms to yesterday's organization of science. The other reflects a trend, which is making a way for itself and lies in the fact that the lowly research collective is becoming the basic organizational unit. We have examined only one of the possible systems. Probably, it is also has weak points in the sense that it involves large expenditures of skilled labor in the submission and examination of requests, with the formalities inevitable in this regard. However, it seems there should be nothing

to fear here: it is better once a year (or several years) to impartially shake up everything being done in basic science, than simply to go with the flow the whole year.

The scientific research institute of the future may, figuratively speaking, be compared to a shore base for submarines. The themes and the collectives working on them are the submarines themselves. Tired crews arrive

at the base and disembark: some undergo physical examinations, other present equipment for repairs and registration. Having received everything necessary, including rest and replenishment, the captain takes the boat out on a new assignment. Here, both the tasks and the responsibilities are sensibly divided: the base is not responsible for successes in battle, but only for the fact that it provided the best support.

Oceanology Institute Employees Set Up Strike Fund

917A0038A Moscow *POISK in Russian* No 47 (82),
23-29 Nov 90 p 5

[Article by Olga Kolesova under the rubric "At the Center of Events": "An Umbrella Instead of a Parachute"; first paragraph is POISK introduction]

[Text] At the Institute of Oceanology of the USSR Academy of Sciences by decision of the labor collective a fund for unforeseen circumstances has been established. Initially they wanted to call it a strike fund, but the board of directors requested that "elements of confrontation not be introduced."

This fund amounts to five percent of the bonus assets. If the institute goes on strike, there will be enough money for two days. In essence, this is an umbrella instead of an ejection parachute. But, in the opinion of trade union committee chairman Aleksey Zakharov, the precedent is important. People should know that it is possible to try themselves to defend themselves, without relying on the state alone.

Thus far they have not gone on strike, but unforeseen circumstances did arise in connection with the vegetable crisis. The people did not want to go to do agricultural work. While the trade union committee and the board of directors did not want to act by arm twisting. Here they paid every associate, who went to harvest carrots, 30 rubles each a day. The carrot was if not gold, then gold-plated.

But this is the last time that the institute decided to help the city—rather, not such much the city as the bureaucratic system.

What prospects does the fund have? Aleksey Zakharov believes that it is possible, of course, to set aside five percent of the bonus every year, but the bonuses are not that large, and in general this is not the solution. Apparently, at the same time as the pursuit of basic science it is necessary to establish at the institute certain commercial structures, which would support themselves plus pay a "tax" to the institute.

It is no secret for anyone that at our academic institutes far from all the associates are capable with a stroke of the pen of advancing science. Geniuses save themselves—if not in our country, then in the West. But what is one to do with those who "will not discover America"? It is possible to save them?

"Of course," replies Mikhail Sinev, a member of the club of voters of the Academy of Sciences. "Two directions of actions are possible. The first: by social pressure to demand of administrative organs social protection. The trade unions should deal with this. The second: the establishment of new workplaces within academic institutes. This can be the development of technologies, teaching, and expert consultation activity.

"At any institute there are people who always perform work on economic contracts and on applied research. They usually earn more. And thank God—they receive, after all, less satisfaction.

"Now a group for the coordination of the activity on social defense has been established on the basis of the club of voters of the Academy of Sciences. But is there hope that its voice will be heard?"

In September a future wage increase was announced to associates of the Academy of Sciences. Inasmuch as new sources of financing are not foreseen, people are afraid that everything will boil down to a reduction of staffs. I am not saying that it is necessary to solve the problem of social protection immediately. Put in an amicable way, this ought to have been done the day before yesterday.

New Scientific Association Modelled on RAND Corporation

917A0047A Moscow *RADIKAL in Russian* No 2,
Oct 90 pp 1-2

[Interview with Academician Nikita N. Moiseyev, chairman of the "Science for the Future of the Country" Association, by Leonard Nikishin; date and place not given—first paragraph is RADIKAL introduction]

[Text] "Science for the Future of the Country"—the association, which was recently established by a number of scientists and organizations (among which is the Business World Consortium), acquired, not without pretension, such a name. Academician N.N. Moiseyev was elected its president.

[Moiseyev] The inability to look ahead and to foresee the development of events is hindering our perestroika....

For this, the academician continues, it is necessary to instill in society and, mainly, its leaders a natural scientific way of thinking, a certain strictness of analysis and conclusions, and the ability to look ahead and to foresee the development of events. It is possible to avoid the "hidden rocks" on the path of the development of society, but it is necessary to see them in time. It is also in the name of this that the association is being established.

[Nikishin] The task!... But for this the association should have an enormous scientific potential!

[Moiseyev] Of course. The association should rely on the entire intellectual potential of the country. We will have to unite various specialists who are engaged today in forecasting activity in many enterprising groups. Among them are very talented people, and it is necessary to learn to unite all these forces. Such attempts were also made earlier, for example, by Academician M.A. Lavrentyev back during the times of Khrushchev. But the consultation council attached to the prime minister, which was established by him, was under the control of the former and could not fulfill what had been contemplated. Our association should be completely independent—this is the first axiom. Our task is the

determination of the palette of possibilities, while the choice and the making of specific decisions are left to experienced workers and statesmen.

[Nikishin] In the United States a well-known organization, the RAND Corporation, has been dealing with this for a long time. Are we establishing an analog of it? Why, as they say, better late....

[Moiseyev] I would not say that our association is a complete analog of the RAND Corporation. It is closer to what existed in the United States before its establishment. Back during the war regular meetings of worried scientists, at which President F. Roosevelt also appeared at times, began to be practiced. He never interfered in the discussions, merely listened, and from time to time asked questions. Of course, these meetings and discussions, which were conducted by people with powerful intellect and much experience and knowledge, helped the country very much during difficult moments. But only Roosevelt made decisions, none of the analysts imposed anything on him. After the death of Roosevelt this group lost its functions, but military men, who contributed to its transformation into an organization with its own structure, status, and much money, carried on the work. Our present aim is consultation functions. We do not want to turn into a rigidly organized structure, in which its own traditions and its own interest, which become the dominant idea of activity, inevitably form. I imagine the following arrangement. When a problem, which it is impossible to solve by means of a round-table discussion, arises, we temporarily turn into a RAND Corporation. Temporary collectives, which make calculations, conduct sociological surveys, make an analysis, and so on, are formed. The results are submitted to the leadership of the USSR and the RSFSR and to the Supreme Soviets of the other republics. At this time other questions, which require a different structure, are arising. It is in this that the distinction from the RAND Corporation consists.

[Nikishin] But various kinds of consultative groups already exist. The most significant one of them is the Presidential Council, to which scientists also belong. Will you not replace these structures?

[Moiseyev] By no means. The Presidential Council is the staff of the President. Its tasks are different, it is a consultative body in the settlement of current matters. While forecasting activity is research, which the Presidential Council in principle cannot conduct. We will be able at any time to bring together under our flag first-rate, talented young people and to set up one team or another made up of associates of academic institutes, universities, and so forth.

[Nikishin] But are you certain that the forecasts and recommendations of the association will always be accurate?

[Moiseyev] You know, forecasting is not clairvoyance. There are many difficulties here, I will not name them. I will merely say that without the inclusion of science the number of errors will be far greater. Not by chance do we not intend to replace anyone, the result of our activity is

supplementary information. Of course, in any human activity it is impossible to avoid mistakes.

[Nikishin] And what areas of analysis, for example, do you consider primary for the activity of the association?

[Moiseyev] The present trend of development of mankind is toward cooperation, the pooling of efforts in economics, ecology, and so on. And our main efforts should be devoted to uniting, not disuniting, issues, such as, for example, the judicious combination of centralized management and a market economy. The expressions "socialist market" and "controllable market" exist. They are simply not very competent. A market is a market. But it is possible to influence it by confining its functioning to a specific framework, for example, an ecological framework. Or a national framework. The market should also be socially oriented by means of a specific policy. Means of influencing it, which take into account the demands of society, which it cannot guarantee by itself, should be developed. It is this that is the main thing today. Feedback loops, which in principle cannot be organized without a market, are extremely important—our 70 years of experience demonstrate the stability of the rejection of market relations. But, on the other hand, does the market really solve all problems? Of course not, take if only ecology. Today the ecological imperative is a requirement of the survival of mankind under the conditions of enormous loads on the biosphere. To surrender the solution of this most complex problem to market chaos means to send mankind in the direction of a crisis. And what about social problems? All of them should be solved outside the market. In the West many a good thing has been done in this respect, but one must not shut one's eyes to the fact that they, too, do not know how to do everything. The overcoming of these difficulties is a global task and it should be accomplished by the entire world community.

[Nikishin] Returning to domestic problems, when studying them will you be able to get by with the forces of domestic specialists, or will you have to enlist foreign experts?

[Moiseyev] I am convinced that the main forces are within us. On our own intellect. But there are, of course, a large number of problems, in which our competence is inadequate. Take the problem of Chernobyl—a terrible disaster that befell our people. Today tens (if not hundreds) of organizations are dealing with this problem. But they are disconnected, there is no united information system. And the information, which they do have and which is extremely important for all mankind, may be lost. But it should be preserved forever. We do not have the means and let us face it, the necessary knowledge, which is connected with the computer processing of information, to establish the necessary information system. I hope that we will organize the International Institute of Chernobyl, which, in particular, will ensure the gathering, processing, and analysis of all the information pertaining to the problem.

And do you think that Chernobyl is the most terrible disaster? Do you think that it is better in the Kuzbass or in Ust-Kamenogorsk? The situation is the same, only not so famous, there are not these glows of radioactivity. But an adverse effect on mankind is occurring. And here, of course, the enlistment of foreign specialists, who for quite a long time have been engaging in precise measurements and the study of the medical consequences of various contaminants, is necessary.

Or take national problems. One or two generations will follow, and we will have to overcome the consequences of today's aspiration of the republics for sovereignty. The word "sovereignty"—it also contains, after all, some disuniting properties. An intricate game, in which one cannot manage without science. Some forms, which, on the one hand, open for us the way to the future and, on the other, solve the accumulated problems for peoples of different nationalities, be it the Ukraine, Russia, or the Baltic republics, should be found. Otherwise we will have to traverse the path which Western Europe already traversed during the postwar years.

[Nikishin] The aspirations for disunion are supported by the belief in a more worthy life than the one that unification in the "indestructible Union" gave—the basic reason, after all, lies in this....

[Moiseyev] Of course. The unification, which we had, was of a forcible nature. I myself am Russian and know well the price that Central Russia paid for at least some development of outlying areas. I can imagine what other parties are also feeling. Now in the country there is not one region where satisfaction with life dominates. But communications were established, enormous production complexes—petrochemical, metallurgical, power engineering, and so forth—appeared. They encompass vast territories, for them there are no oblast and republic boundaries. Try to demolish all this—this is a terrible misfortune! It is the same as demolishing multinational corporations.

And another thing. Ethnic boundaries are broader than state boundaries. And in case of the establishment of state boundaries on some ethnic basis human rights, like it or not, are violated.

[Nikishin] Well, with what do you intend to begin?

[Moiseyev] With the serious discussion of the Shatalin-Yavlinskiy program. We can help them, having studied the question fundamentally—with quantitative estimates, estimates of the social consequences, and so on. The threads will extend to national problems, transrepublic companies, and much more.

It must be said that regardless of which forms the future union of republics will assume, such a tool of analysis—socioeconomic, ecological, political—as our association will be needed. Moreover, I believe that if we were to go beyond the Soviet Union and find contact with specialists in these matters in the European Committee, I see the quite broad prospect of the intellectualization of contemporary political and economic life of the planet.

Aging Problem in Academy of Sciences Discussed

917A0007A Moscow PRAVITELSTVENNYY VESTNIK in Russian No 41(67), Oct 90 p 8

[Article by Yu. Bobylov: "On Pension... By Force"]

[Text] Today many are speaking and writing about the aging of our research cadres, about the gerontocracy in academic science. There are grounds for alarm: According to USSR Goskomstat data, the average age of all scientific employees is roughly 42 years, of candidates—47 years, and of doctors of sciences—59 years. The average age of USSR AS academicians is 69.5, and of corresponding members—63.7 years.

Two and a half years ago, the CPSU Central Committee and USSR Council of Ministers formulated the task of "sharply increasing the practical output of scientists, designers and technical workers." The resolution listed one of the most important factors as "the creation of an effective system for optimum renewal of the collective." Has a substantial rejuvenation of scientific organizations occurred? Judging by the statistics, the situation has changed little. It is no accident that suggestions are being received from academic spheres on introducing annual "five-percent" personnel reductions in scientific institutes.

Possibly, scientific youth rejoices at this, but it causes dismay among elderly people, who have honestly devoted 20-25 years to science and now fall into the category of those being "cut" from the sphere of science. For some, the reduction will mean a loss of earnings and customary way of life and a need for retraining. For those living in the country's "scientific cities," obviously, it also means needing to change place of residence.

There is no doubt that rejuvenation is promising for raising the efficiency of scientific organizations. Youth and productivity in the natural sciences are related, as confirmed by information about Nobel Prize winners in physics over a period of 75 years: Half of them reached their "golden hour" when they were not even 35 years old, a third—in the ages from 35 to 43 years.

Of course, it is not just a matter of age. The poor development of scientific instrument building, the lack of sufficient systems for labor mechanization and automation, discouraging systems of payment, the rigidity of organizational structures, and much else are telling in the low output of our scientific research institutes and design bureaus. Nonetheless, rejuvenation, despite all these obstacles, enables us to intensify the activity of the country's scientific organizations.

However, this idea worries many people and aggravates the problem of social security for aging and elderly scientific employees. In planning a goal, it is important to determine the means and methods of achieving it.

Will progressive foreign experience help us solve the problem? In the U.S., for instance, the contract system of temporary employment plays an important role: There are about 600,000 "migrating" scientific employees.

Intermediary companies often hire the cadres. Under such a system, a scientific employee, losing his creative potential due to age or health, almost automatically also loses his chances of finding a job.

In Japan the system of "lifetime" employment operates, and aging scientific employees are not dismissed. They are ironically called "madogivadzoku" (in translation: "the engineer by the window"). However, the companies spend, it seems, considerable resources to retain useless employees. This is not only out of sympathy, but also for... encouragement of young workers. Seeing that his happy future in the company is guaranteed, the person devotes all his efforts to work, often above and beyond the call of duty.... In short, the way of the U.S., Japan and other countries is hardly acceptable for our science: There are still the difficulties with housing and the passport system in large, science-intensive cities. This means that we must seek our own path.

In our country, there are a number of professions for which an age limit is set, making it possible to retire men at up to 60 years of age, and women—up to 55 years. The new pension legislation preserves this procedure. Consequently, "scientific pensions," as we call them for lack of a better term, may be acceptable.

Of course, the details of this "exit" from the science sphere for elderly employees require serious refinement. However, today it is possible to name a number of specific features which must be considered. First, aging scientific associates are losing their abilities for productive labor only in scientific research institutes and design bureaus, and at that it is relative. Their potential is fairly high for work in industry and in the training of cadres.

Obviously, it is possible to create a procedure for removing such specialists only from science, not from the national economy in general. This circumstance may also predetermine the size of "scientific pensions." It is possible that designating someone a "cut" scientific employee could be a real social guarantee.

Second, it is possible to provide certain privileges for "scientific pensioners"—in finding jobs, changing place of residence, and retraining. Finally, special privileges are needed in establishing the size of "scientific pensions" for employees who have made a significant contribution to science, who have degrees and titles.

A natural question: Given the current financial strain, where will the money come from for "scientific pensions?" Let us note that in the first mass reduction (even more than "five-percent") a large number of simply aged employees and many specialists, undeservedly receiving a high salary, will leave the research institutes and design bureaus. For them, the usual or "scientific" pensions will be far less than their real salary. Part of the funds thus freed can be used for privileges for these same scientific employees, another part—for raising the payments to young scientists.

In forming a policy for rejuvenating scientific cadres, it is useful to consider the experience of retirement on "military" pensions for servicemen in the USSR Ministry of Defense, the USSR KGB, and the USSR Ministry of Internal Affairs (MVD).

Unfortunately, it is impossible to change the situation that has taken shape, which requires rapid and radical measures, without material and other losses for a certain segment of scientific employees who have lost their potential.

Enterprise Financial Support Needed For Technical Training

917A0042A Moscow INZHENER in Russian No 10, Oct 90 pp 21-22

[Interview with Boris Sergeyevich Mitin, chairman of the Association of Engineering Higher Educational Institutions and rector of the Moscow Aviation Technological Institute, by INZHENER correspondent E. Sorkin, under the rubric "Point of View": "It Is Possible To Sell Education"; date and place not given; first paragraph is INZHENER introduction]

[Text] B. Mitin, chairman of the Association of Engineering Higher Educational Institutions and rector of the Moscow Aviation Technological Institute, answers the questions of our correspondent.

INZHENER: Boris Sergeyevich, some time ago I had a conversation with the rector of the Petropavlovsk-Kamchatskiy Higher Engineering Marine School (TEKHNICA I NAUKA, No 8, 1990—E.S.). From the discussion with him I realized that one of the main problems worrying higher educational institution (VUZ) personnel is the lack of interest of enterprises, which have become economic independent, in young specialists. Enterprises do not want to pay the money due from them—3,000 rubles—for each graduate assigned to them, although this amount far from covers the outlays on training. The impression is created that production workers during the current period of the transition to a market have lost interest in scientific and technical progress, since the reinforcement of the engineering corps does not worry them.... Or is this a regional problem, one that is typical only of outlying regions?

B.S. Mitin: No, unfortunately, this problem is urgent for many engineering higher educational institutions. On the one hand, the monopoly position of the majority of enterprises, which for the present is being maintained, does not stimulate them to update products, to improve production, and to enlist talented young people in this matter. On the other hand, the financial aspect of the matter is restraining. The new Law on Enterprises in the USSR states that the enterprise determines independently the directions of the use of the new profit. But of what interest is it to enterprises to invest their assets in higher educational institutes, reducing by this, for example, the allocations for social amenities? If only in the form of donations.... No, these investments should be profitable and not burdensome for labor collectives, and it is not that difficult to do this: It is sufficient not to tax them. We are now preparing the corresponding proposals for the government.

INZHENER: Another problem, about which they told me in Petropavlovsk-Kamchatskiy, is the existing difficulties with the establishment of a system of continuous education, which includes the school—the tekhnikum—the higher educational institution. There they would like to establish a multifunctional educational institution, so that the path to an engineering diploma would consist of

three successive stages: after the school or at the same time as the school the obtaining of a working occupation, then the obtaining of a secondary technical education, and after it a higher technical education. At any intermediate stage a young person is free to interrupt his training and to go immediately to work, having a document on the acquired specialty....

B.S. Mitin: For such higher educational institutions as the engineering marine school, which trains specialists of the fish industry, such an arrangement is entirely justified. But for us the point of continuous education is slightly different. We begin it with our base schools, where our instructors are members of the examination commissions at the graduation examinations. Having received a school leaving certificate, the graduates of these schools can enroll here without examinations. Among our entrants approximately half are such young people.

Now with regard to the two-stage nature of engineering education. We will also have a two-stage nature, but of a different sort: In four years of training at our higher educational institution an undergraduate acquires the knowledge which enables him to work, as we say, as a line engineer at a works. If he has studied another two years, he becomes a research engineer. Such a technical college in our engineering field is more efficient, and it does not make sense to combine it with a tekhnikum. These two types of educational institutions should exist separately.

Moreover, it is necessary to take into account that continuous education does not end with the obtaining of an engineering diploma. A system of the retraining of personnel, which is important especially now, when large reductions are anticipated, should also exist. Meanwhile in the country practically no one is dealing with this problem. Only the fact that in the recently established Science-Industry Union, in which the Association of Engineering Higher Educational Institutions is one of the founders, there will be a special committee that deals with these issues, is reassuring.

INZHENER: Another problem I know of for higher educational institutions is the dropout of students. It is no secret that many of them are admitted to engineering higher educational institutions by chance. The state pays the money for them for two-three years, but then they leave the institute or they are flunked out, and the money is wasted. If the student paid for training, he would, obviously, treat the choice of occupation more seriously. Perhaps, it would be more advisable to give a portion of the money, which is being used for a higher education, to the parents, then they could pay for the training of their children at higher educational institutions. At western higher educational institutions does the dropout problem probably not worry their executives that much?

B.S. Mitin: Not that much. Because their system of higher education is organized in a different way. Last year I visited universities and colleges of the United States—in Virginia, Philadelphia, Delaware, and Indiana. How do people become undergraduates of an

American university? After completely the secondary school, "high school" according to American terminology, the graduate, who wishes to study at a university, takes a national examination. It is possible to do this in any city. Having tested his knowledge with respect to a specific program, he collects a sum of points. With these results he can apply simultaneously to several universities. It is difficult to guess precisely which university will admit him to studies, inasmuch as at each one there is its own specific nature of recruitment. There is no common passing grade for a university.

Now with respect to tuition. A specific tuition, which is common for all universities, does not exist there. For example, Virginia Polytechnic Institute, which is a part of the University of Virginia, for one year of instruction charges \$6,000, private universities charge \$11,000-\$12,000, Massachusetts Institute of Technology, with which the Moscow Aviation Technological Institute is proposing to actively cooperate, charges even more—\$14,000-\$16,000. The tuition includes the outlays not only for instruction, but also for the use of the library, as well as for board, room, and other services. It should be said frankly that the standard of living and the level of studies and relaxation of American undergraduates are very high. They have all the conditions for an education.

Here it is also necessary to note that when enrolling in a university the material status of undergraduates is also taken into account. The children of parents of modest means receive certain benefits. The scholarship also exists there. It is possible to receive \$500 a month on the condition, however, that after starting to work the former student returns the entire amount paid to him with interest.

And, of course, in answering your question about the dropout, I will say that they do not have the problems with discipline and progress in studies in the form, to which we have become accustomed. The American undergraduate is very energetic, hardworking, and purposeful. There are extremely few flunk-outs—on the order of five percent. But in those instances, when an undergraduate all the same has flunked out, he has the opportunity, having worked a while at some enterprise, to return to the university.

INZHENER: The new membership of the Moscow City Soviet intends to engage vigorously in the improvement of the system of education in the capital. Moscow City Soviet Chairman Gavriil Popov said that education is the "commodity" that economically independent Moscow will be able to "sell" to other regions of the country. Thus, should local organs of power now be interested in the development of the higher educational institutions that are located on their territory? What is the situation with this in the United States? To whom do higher educational institutions belong there?

B.S. Mitin: Nearly all the higher educational institutions in America belong to the individual states or are private. Only four higher educational institutions are subordinate to the American Government—these are the military academies. The management system at American universities is quite rigid: The board of trustees, which consists of influential and respected people of the state, appoints the head of the university, he appoints the deans, and they appoint the chairmen of the departments. The authorities of the state are also interested in the activity of their higher educational institutions, in particular, because there preference in admission is given to local residents. Thus, the university in Virginia gives 60 percent of the spaces to state residents. For the residents of other states there is their own competition, for foreigners there is their own.

The support of higher educational institutions by the authorities of states, which allocate considerable assets for them, is also explained by the fact that the graduates, by participating in the development of the scientific and technical base of local industry, create new workplaces.

INZHENER: But what if the activity of a local university does not conform to these tasks? Let us assume that its graduates have poor training, due to which local firms do not want to hire them. Who monitors the activity of the university?

B.S. Mitin: There, of course, the ministries with their statistics and inspectors, to which we are accustomed, do not exist. But means of monitoring the methods level of departments in the United States do exist. And the demands on them are very exacting. In America there are a large number of diverse scientific and technical societies, on the basis of which the corresponding commissions for the certification of departments are established and operate. Moreover, the department itself is interested in the most exacting and authoritative certification. An uncertified department can simply be dissolved. Therefore, the departments themselves address this request to the appropriate national commission. If the commission agrees to carry out certification, first it sends to the department a very thick pile of questionnaires which concern all aspects of its activity. And only when all the objective information has been gathered do representatives of the commission come for the final settlement of the question.

INZHENER: Will the association of engineering higher educational institutions be such an organization, which will help to ensure the necessary level of training of engineers in the country?

B.S. Mitin: Undoubtedly. We are now formulating on the order of large enterprises the Engineer-2000 Program, which should also solve, in particular, the problems, about which you and I have spoken.

INZHENER: It is possible to hope that, when the program has been adopted, you will tell our readers about it?

B.S. Mitin: Yes, of course.

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Industry Slow To Adopt New Lubrication Technology

917A0040A Moscow VESTNIK

MASHINOSTROYENIYA in Russian No 9,
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[Article by Candidate of Economic Sciences O. M. Soldatov and Candidate of Technical Sciences L. A. Shaposhnikov: "Problems of the Introduction of a Discovery of Soviet Scientists"]

[Text] In recent years the questions of scientific and technical progress, the increase of the return from basic and applied research, and the effectiveness of the innovations being introduced have constantly found reflection in the pages of the press, since in various sectors of the national economy it has hardly possible to continue forward movement with the old stock of traditional technical solutions. The fundamentally new solutions in the area of scientific and technical progress are promoting qualitative changes in the sphere of physical production and various sectors of the national economy. The comprehensive objective and timely evaluation of proposals, which can have a substantial influence on the development of the economy and can accelerate scientific and technical progress, is needed. These questions were raised at the annual assembly of the USSR Academy of Sciences at the end of 1989.

Among technical innovations the discoveries of Soviet scientists are acquiring increasing importance. Several of them are being implemented extensively in daily life. However, many discoveries get a start in life with difficulty and in spite of favorable evaluations for a long time do not find practical application. A graphic example of this is the situation with the use of the discovery of Soviet scientists I.V. Kragelskiy and D.N. Garkunov, which is known as the wearlessness effect.

At present the problem of increasing the reliability and durability of various machines and equipment and the capacity of machine building machinery over a long period of its operation to maintain the specified operating parameters is urgent. Suffice it to say that a significant portion of the machinery breaks down due to the wear of friction surfaces of parts and assemblies. In turn, as studies of scientists and specialists show, wear in many respects is governed by the quality of lubricants. Billions of rubles are being spent annually on the repair of machine building machinery, including for reasons of the wear of its parts.

The discovery named above makes possible the development of lubricants on a fundamentally new basis. The use of the method of selective metal transfer in case of friction makes it possible to reduce the consumption of oil to one-third to one-half and the consumption of fuel by three-five percent, to increase the life of machines by one and a half-to-two-fold, to decrease the content of carbon monoxide in the exhaust of motor vehicle engines to

one-half and less, and to reduce labor expenditures in equipment repair. The saving from the use of new types of lubricants at just to repair plants and industrial enterprises of various sectors of the national economy, according to preliminary data of the USSR Academy of Sciences, will annually come to 15-20 million rubles. Here it should be noted that a comparatively small amount of capital investments will be required for the organization of the production of such lubricants. As a whole the noted advantages of the new types of lubricants provide every reason for the expansion of their production.

It should be emphasized that the basic principles of the discovery named above are being used extensively in a number of countries: the United States, England, France, and others. Scientists of the USSR Academy of Sciences spoke in favor of the development of the new direction in the devising of lubricants. The USSR State Committee for Inventions and Discoveries in 1966 registered this method as a scientific discovery, the use of which in the national economy of the country will make it possible to obtain a large saving.

However, the practical use of this discovery is not at the proper level, in spite of the fact that in 1987 the USSR Council of Ministers adopted the decree "On Measures on the Extensive Use in the National Economy of the Wearlessness Effect." This document provided for the conducting of a significant amount of scientific research work on the development and production of new lubricants and advanced components of machines and mechanisms, which ensure the implementation of the indicated discovery. It would seem that the former USSR Ministry of the Petroleum Refining and Petrochemical Industry and its organizations should have taken all steps for the settlement of the question of the extensive use of the wearlessness effect in the national economy. The development of the compositions of metal-cladding lubricants, the organization of production and their introduction in the national economy, and the development of antifriction grease fillers and a technology of finishing nonabrasive treatment were assigned by the government decree to enterprises and organizations of this ministry.

Unfortunately, it has to be stated that the government decree on this question is not being fulfilled. Any machine building department could have undertaken the solution of this problem. Such a lubricant is needed most of all precisely there. And who else but machine building enterprises are to display an interest in lengthening the service life and increasing the reliability of the pool of machines and mechanisms, which is being produced, by the use of the new lubricants. For the purpose of accomplishing the tasks set by the government machine builders could have enlisted in the solution of this problem a broad group of specialists and scientists, who work in related fields of science and technology.

But in spite of the instructions of the government, the urgency of this problem has not been eliminated. Being

the head organization, the USSR Ministry of the Petroleum Refining and Petrochemical Industry should have concentrated the efforts of the scientific potential of sectorial institutes and production organizations on an integrated approach to the solution of the problem. Especially as at several academic institutes, higher educational institutions, and specialized scientific research institutes research in the area of the wearlessness effect had already been conducted. As an example it is possible to cite the developments of the Institute of Machine Science imeni A.A. Blagonravov of the USSR Academy of Sciences. A special method of the X-ray analysis of thin surface layers of lubricant, which makes it possible to establish that the selective transfer of metal and its deposition on friction surfaces occur at the initial stage of friction, owing to the creation of special conditions, was developed precisely at this institute. At the same time as the in-depth study of the problem integrated research, which was connected with the development of so-called wearless lubricants, was conducted at the institute. New lubricants and oil additives, a technology of the finishing nonabrasive treatment of friction surfaces (FABO), seals, which work under extreme conditions, and so on were developed on the basis of the phenomenon of selective transfer. This is just a negligible portion of the performed work in this area.

To execute the decree of the Presidium of the USSR Academy of Sciences for the purpose of expanding research the Wear Resistance Engineering Center, which in the past two years completed a number of developments, was established in Leningrad. There is a research program that envisages the expansion of work on these themes to 2000. The aspiration of academic science to develop the new direction and thereby to promote the acceleration of the solution of a large number of most important national economic problems, starting with the increase of the life of machines and the decrease of the outlays on their repair and ending with the solution of a number of ecological problems, exists.

Work was also performed at higher educational institutions and sectorial institutes. To execute the decree of the government at the head organizations of the former USSR Ministry of the Petroleum Refining and Petrochemical Industry—the All-Union Scientific Research Institute of the Petroleum Industry (VNII NP) and the Magma Scientific Production Association—patent research was conducted and information materials were analyzed for the purpose of appraising the current situation with lubricants that implement the wearlessness effect in case of friction. A methodology of studying lubricants for the identification of this effect was developed, a set of tribological tests was conducted on friction machines and stands, and the topography of the phase composition and chemical composition and the structure of friction surfaces were studied with the use of advanced equipment. The results of the work were discussed in the Academic Council of the All-Union Scientific Research Institute of the Petroleum Industry.

A simple enumeration of the problems testifies to the necessity of the organization and conducting of goal-oriented work in this area. Thus far the organizations themselves have determined the orientation of research, without coordinating it with the work being conducted by various scientific organizations. There is no common plan on the implementation of the decisions of the government on the expansion of the work in this area. A number of higher educational institutions of the country were commissioned to prepare the necessary documentation for the assurance of the output of test batches of lubricants. However, subsequently they were also charged with the output of these batches. It is difficult to fulfill such an assignment, especially if higher educational institutions do not have the necessary apparatus, equipment, and instrumentation, which in the end dragged out the completion of the planned operations and their individual stages. It should be emphasized that the conclusions of individual institutes in accordance with the results of research in this area are contradictory. What specifically was proposed by specialists in the area of the development of new lubricants?

This is clearly evident from the decision of the Academic Council of the All-Union Scientific Research Institute of the Petroleum Industry of 30 June 1989, in which it is stated that "the theoretical concepts of the mechanism of selective transfer in case of friction are hypothetical and contradictory. Reliable examples of the practical implementation of this effect in equipment are lacking." And further: "the effect of metal-cladding cannot be regarded as a variety of selective transfer and a general-purpose means of controlling friction and wear."

At this meeting of the Academic Council it was noted that the laboratory bench and service tests of the SMP-5 and SM-01L lubricants and the MKF-18, Griterin 2, and Griterin 3 additives "did not confirm their advantages over commercial lubricants and in a number of cases revealed their substantial drawbacks." Of course, scientists have the right to draw conclusions with regard to the essence of the problem, but, after all, if we are dealing with fundamentally new lubricants, the corresponding new methods and recommendations should be developed for the checking of their properties.

As an illustration let us cite the example, when the service tests of the MKF-18U lubricant in the USSR and the GDR, which were conducted in 1989, yielded positive results, while the Commission for the Use of Fuels, Oils, and Special Fluids of the USSR State Committee for Standards after tests in accordance with the old methods recognized this lubricant as unsuitable for use. This commission has been made responsible for the qualitative level of the conducting of tests of new materials and the elaboration of recommendations on their subsequent use. However, to this day the commission continues to use methods that were developed many years ago for testing conventional lubricants.

As a whole the analysis of the state of affairs in the country with the implementation of the discovery of the

Soviet scientists showed that the All-Union Scientific Research Institute of the Petroleum Industry had taken a negative stand with respect to the introduction of new lubricants in the solution of the problems of increasing the serviceability of machine building machinery.

It is also necessary to note that the problem of using the wearlessness effect in the national economy has broader aspects. Its economic aspect is meant. Unfortunately, thus far the appropriate organs of the country have not developed an economic mechanism that ensures an interest in work on the development of new types of lubricants.

Today operating services, which rate favorably lubricants based on the wearlessness effect, are feeling the need for the extensive use of such lubricants. The USSR State Planning

Committee, the USSR State Committee for Material and Technical Supply, the USSR State Committee for Prices, and the Economics Department of the USSR Academy of Sciences kept aloof of participation in the elaboration of the economic and organizational questions.

The problem of developing lubricants on a fundamentally new basis with the use of the wearlessness effect deserves more attention than was devoted to it before. Scientists and specialists of various fields of science and technology should be enlisted in its solution. It is necessary to provide for the performance of work in accordance with a unified coordinating plan that ensures the specification of the steps on the further development of research in the solution of this problem, which is extremely important for the national economy.

Soviet-U.S. Joint Venture Hopes To Slow Japanese Microelectronics

917A0044A Moscow RADIKAL in Russian No 3,
Nov 90 p 2

[Interview with Doctor of Technical Sciences Nikolay Timofeyevich Kleshchev, general director of the InterEVM International Center for Information Science and Electronics, by RADIKAL correspondent Dmitriy Dmitriadi; date and place not given: "High, Silicon Valley!" [as published]—first two paragraphs are RADIKAL introduction]

[Text] American developers of integrated microcircuits regard their Soviet colleagues as potential allies in the drive against the electronic expansion of the Japanese.

For some people such an assertion will seem very nearly derisive. But as Doctor of Technical Sciences N.T. Kleshchev, general director of the InterEVM International Center for Information Science and Electronics, believes, such a conclusion is now close to reality. Confirmation of this is the recent trip of Soviet specialists headed by him to California's Silicon Valley, about the results of which he talks with our correspondent.

[Kleshchev] InterEVM, which I head, is, apparently, the last offspring of CEMA. It was founded in 1989. But it seems that the child intends to outlive its parent a long time—last year alone it yielded our country a profit of about 13.5 million rubles.

InterEVM is devoting particular attention to promising developments in such areas as the devising of workstations (ARM's, if we use Soviet terminology) for designing very large-scale integrated circuits, equipment for medical diagnosis, and mass optical storage devices.

The pragmatic, as always, Americans invited us not for no special reason. It turns out, for example, that at such a well-known firm as Advanced Micro Devices there is no one to perform "rough" intellectual work: There are not enough rank and file engineers and programmers. And in this sense the Americans have hope only in us, Nikolay Timofeyevich says.

Seven protocols on intentions to establish joint ventures with InterEVM for the designing of very large-scale integrated circuits with a high degree of integration were signed. Even a financial contract was signed with another firm—Cypress Semiconductor. Only that is just it: In addition to our center, the attraction of other organizations on the Soviet side is also necessary. But for some reason they are not being found, although such a venture promises them a direct advantage in the form of access to advanced technology. How is it not just another demonstration of our slowness?

Of course, I would like very much to see my associates not in the capacity of cheap manpower, but as an irreplaceable intellectual component of the production of computers. For example, in the following chain: We

develop the microprocessors, the Cypress firm manufactures it, then the integrated circuit is mounted on a board of the FORTRON firm, and, finally, final assembly takes place at plants of the world-famous Sun firm. The computer is ready.

[Dmitriadi] As far as I understand, the creation of such a "chain" is a thing that has already nearly happened. But is it impossible, for example, in the Soviet Union also to set up the production of advanced computer hardware over the complete cycle?

[Kleshchev] What is it impossible? It is possible.... Only for this the restrictions of the Coordinating Committee on Export Controls, which are no longer in effect with respect to the East European countries, should be lifted. Apparently, in spite of the assurances "of the most complete respect for us," in the USSR they see not only an ally, but also a potential competitor. That is why they are also supporting a certain technical lag of the Soviet Union.

But now I will ask you a question. Do you know what astonished me most of all during the trip?

[Dmitriadi] ...?

[Kleshchev] The universities, where they are training future developers and process engineers.

In the level of supply with scientific equipment and workstations San Jose State University, for example, can compete with many medium-sized firms. But the equipment does not lie there as dead weight: In addition to educational work the development of promising models of computer hardware is also being carried out. And when it begins to be produced, the first specimens of the innovation go...to universities! And it often turns out that an American "young specialist" comes to a firm earlier than the equipment, for work with which they trained him during his studies. And what about in our country?... They manage to write off a computer several times before it gets to a higher educational institution!

[Dmitriadi] Then do our specialists have enough skill, if they have to judge the majority of latest developments only from journal articles?

[Kleshchev] If you believe our western colleagues, who recently visited our center, given a little advanced training they absolutely do. In any case, that is what, for example, Professor Ruge of Munich—a consultant of the FRG Government on questions of the development of microelectronics—believes.

However paradoxical, we should thank our technical backwardness. The Soviet programmer is always the "conqueror" of unreliable domestic hardware. He is disposed to finding its reserve capabilities, which make it possible still to solve the posed problem. And if the "searching intellect" of the domestic specialist is combined with the latest imported hardware, from such a symbiosis it is possible to expect phenomenal results.

[Dmitriadi] But are you not afraid that one fine day an associate of the center, who has gone to the United States to deliver a completed job, will remain there forever, in order, having been naturalized, to earn more and to live better?

[Kleshchev] Honestly speaking, I am. But still I hope that with the passage of the Law on Departure we will lose not more than 10 percent of the personnel. Brain drain is not only an economic, but also, if you wish, a political concept. It threatens not only our venture. We are trying to take

vigorous and, what is the main thing, preventive steps against it. Among such steps are the establishment of a joint venture, which has in the USSR, as is known, certain privileges, the giving to us of the status of a joint-stock company, and then there is, of course, the location of future centers of the development of very large-scale integrated circuits in Silicon Valley. Associates of the center will be able to go to the United States regularly, and the guarantee of their return, I believe, lies precisely in this.

**RSFSR State Science Committee Outlines
Republic's Science Program**

917A0043A Moscow RADIKAL in Russian No 3,
Nov 90 pp 2-3

[Article under the rubric "The Extraction of the Essence": "The Science of Russia"—first paragraph is RADIKAL introduction]

[Text] The Russian Soviet Federated Socialist Republic (RSFSR) State Committee for Science and the Higher School is now completing the work on the new concept of its further development. Staff members of the State Committee consider it necessary to familiarize the scientific community with this concept in advance, while it is still in "raw" form. At the request of the State Committee we are publishing one of the initial versions of this concept. The Russian Government hopes that every interested person will take part in the discussion.

The Basic Goals

The concept is being included as a component in the program of stabilization and the transition to a market, which was adopted by the RSFSR Supreme Soviet. The basic goal of the concept is the creation of the conditions for the painless entry of scientific organizations into the market and the preservation and increase of the scientific and technical potential.

It is proposed to draw up in the shortest possible time a number of draft laws on the organization of science. It is anticipated that these laws will ensure the pursuit of an effective tax policy, which will stimulate scientific activity and will make it possible to avert the emigration of scientific personnel abroad.

The Ways and Means of Implementation

The formulation of the directions of science and technology policy is carried out publicly with the use of various forms of public discussion, examination, and competitions.

The pursuit of an active state policy in the area of the development of science and technology, which is aimed at the qualitative replacement of the productive forces, which have been created in the country, and the establishment of a new technological structure.

The establishment of a system of the state-public regulation of scientific and technical progress as the main factor of economic growth.

The efficient use of the goal program method of planning in the conducting of large-scale basic research and in the achievement of scientific, technical, and technological breakthroughs in the priority directions of scientific and technical progress.

The rapid development of science at the higher school will ensure the sharp increase and will boost the level of

scientific products in the country, will intensify competition in the scientific complex, and will have a substantial influence on the increase of the quality of the training of specialists and of the efficiency of the national economy.

The extensive use of advanced information technologies, the development of information media, and the formation of a specialized infrastructure.

The development of a state system of guarantees and the legal regulation of scientific activity on the territory of the republic. The implementation of an effective tax policy, the rapid introduction of the results of scientific activity, the development of science-intensive technologies and works, and the increase of the prestige of the labor of scientific personnel.

The active use of the market for the removal of state control over and the demonopolization of science, for the intensification of the competition of scientific collectives, for the conducting of alternative research and development, for the establishment of small innovation enterprises and organizations, and for the privatization of science-intensive small-tonnage works. The partial privatization of scientific research institutes.

The System of Management

The organizational and economic restructuring of the activity of institutions of science for the purpose of ensuring the most efficient use of the resources being allocated to them.

The carrying out of the restructuring of the system of management in the direction of decentralization, democratization, and demonopolization.

The combination of the functions of state-public regulation and economic independence. The implementation of the principles of the self-management of scientific organizations.

The orientation toward the qualitative structural reorganization of science and toward the abandonment of the formation of numerous large scientific collectives. The creative group of scientists, which advances and implements its own research programs, which are provided on a competitive basis with assets that are allocated by the state, individual organizations, or private persons, should become the organizational basis of scientific work.

The changeover to a contractual system of the organization of scientific work. Contracts for scientific work should be concluded both with individual scientists and with heads of groups of scientists.

The formulation of a unified science policy, the coordination, mediation, and stimulation of integration processes and interVUZ (higher educational institution) and interdepartmental cooperation and specialization. The establishment on the basis of higher educational institutions and scientific research institutes of the Academy of Sciences of a number of scientific educational complexes.

The Financial and the Material and Technical Support of the Concept

Clearly realizing that with the transition to a market economy under the conditions of a stringent financial policy scientific activity may be endangered, it is necessary to maintain in 1991 the level of state support of scientific activity. To carry out the allocation of assets for its financing with allowance made for the increase of prices or in fixed fractions of the amount of budget revenues.

- To earmark allocations of 1.588 billion rubles [R] (excluding capital investments) from the state budget for the financing of science. The average annual growth rate in 1992 is 15.3 percent, in 1993 not less than 16 percent.
- To provide capital investments for the sector "Science and Scientific Service," including the VUZ sector of Science, in 1991 in the amount of R1.3 billion with an average annual growth rate during 1992-1993 of 16 percent. The capital investments for the building of facilities of science, scientific organizations of higher educational institutions, and the pilot experimental base will come to R350 million in 1991 (in 1984 prices) with an annual increase of up to five percent during 1992-1993.
- To provide for the additional state budget financing of science in the amount of R13.2 billion by the elimination of the existing system of the financing of sectorial ministries of union subordination, the elimination of the centralized funds for the development of science and technology of ministries and departments of the USSR, and the use of these assets for the fulfillment of the most important scientific and technical programs in the interests of Russia.

The Mechanism of the Financing of Science (The Basic Principles)

Republic organs of state administration on the basis of a competitive approach carry out the distribution of state budget resources on the territory of Russia.

State budget financing should ensure the conducting first of all of basic, exploratory research. Applied research and development should be financed, as a rule, by the attraction of nonbudgetary assets. Research and development in the area of defense, medicine, culture, education, informatization, communications, ecology, and so forth, as well as assignments of state scientific and technical programs may constitute an exception.

The change of the structure of the financing of scientific research in the following manner:

- the increase of the share of basic operations to 14-15 percent (first of all by means of budget allocations);
- the increase of the spending on the duplication and dissemination of new equipment and technology to 50-55 percent (primarily by means of nonbudgetary sources).

A multiplicity of sources of financing and its goal orientation. The allocation of financial assets for the solution of specific scientific problems and the conducting of the corresponding development, and not for the maintenance of scientific institutions, should become the basic principle of their distribution.

The goal program approach as the basis in the solution of major problems of an intersectorial nature.

The changeover in the financing of basic and exploratory research to a system of grants. The establishment of the republic "Science Fund of Russia," the organization of cooperation with the all-union fund for the financing of basic research.

The extensive use of the proportionate participation along with the state of interested enterprises, organizations, and banks in the financing of state scientific and technical programs, research and development in the area of defense, medicine, culture, education, informatization, communications, ecology, and so forth. In particular, the mechanism of the financing of individual applied programs will be the following. The RSFSR State Committee for Science and the Higher School will act as the founder of the bank "Science and Advanced Technologies," through which the extension of commercial credit for individual scientific and technical jobs and programs will be carried out. In such a case a bank examination will be the basis for the making of decisions on the extension of credit. The bank will be open for outside enterprises and organization, which could join as shareholders. Here the controlling interest should remain with the State Committee, so that only it in the end could determine science and technology policy.

During the transition period, that is, until the time, when the bank "Science and Advanced Technologies" begins to operate at full capacity, the financing of individual applied developments and programs will be carried out on a returnable basis at a specific interest rate and for a strictly fixed time.

The development of venture financing. It is necessary to ensure by the varying of the interest rate the profitability of making financial assets available primarily to small dynamic firms that have commercially promising scientific developments.

The financing of parallel developments, the implementation of alternative projects.

The establishment of the philanthropic fund "Science of Russia." With allowance made for the specific nature of the current period to allocate assets from this fund for the support of young scientists and engineering personnel and for the prevention of the mass emigration of scientific personnel.

The extensive notification of the community about the spending of the state budget assets that have been allocated for science.

The Principles of the Formulation and Examination of Scientific and Technical Programs and Projects.

The formulation jointly with the scientific teaching community on the basis of expert evaluations of the most important republic comprehensive programs which require considerable financial and material expenditures. The preparation of a list of programs for approval by the Supreme Soviet and the Council of Ministers of the RSFSR. The monitoring of their implementation.

The implementation of the priority directions of science and technology by the formulation and the backing with resources of republic comprehensive programs and the carrying out of the monitoring of the progress of their implementation.

The organization of the examination of programs and projects by means of specially organized subdivisions in the USSR Higher Certification Commission, the Russian Patent Department, the State Committee for Inventions and Discoveries, scientific organizations, expert councils of the RSFSR State Committee for Science and the Higher School, and so forth with the extensive enlistment of the scientific community, associations, scientific and technical societies, foreign experts, and so on.

Participation in the formulation and implementation of republic and regional programs of scientific research in the interests of the national economy of the republic and regions. The partial financing and material support of assignments of the programs.

Innovation Activity

The formation of a network of innovation funds. The right to found a fund should be guaranteed to any juridical person. The establishment of joint-stock scientific production concerns.

The formation of a market of scientific and technical products.

The creation of the most favorable economic conditions for the organization and development of alternative small innovation structures—centers of the scientific and technical creativity of youth, scientific technical cooperatives, cost accounting centers and collectives attached to public organizations. The organization of lease scientific collectives.

The legal and tax stimulation of innovation activity, including the introduction of tax credits for sponsors of entrepreneurs.

International Scientific and Technical Collaboration and Cooperation

The rapid development of foreign economic activity and the strengthening of international collaboration with higher educational institutions, organizations, and firms of foreign countries are specified as the most important program provision.

The basic aim of international policy in the area of science is the inclusion of republic science in the international division of labor in the generation of knowledge. The main supporting principles under the conditions of the transition of the country to a market are:

- The foreign exchange cost recovery of international scientific and technical ties (MNTS's).
- The decentralization and demonopolization of international scientific and technical ties.
- The partial privatization of international scientific and technical ties.
- Extensive participation in international scientific societies and funds.

Legal Support

To lend scientific and technical progress a qualitatively new level, which is conducive to the formation of a rule-of-law state and its efficient activity in the sphere of science.

To participate actively in the drafting of a package of legislative acts that are aimed at the intensification of scientific and technical progress:

- on state science and technology policy;
- on intellectual and industrial property;
- on innovation activity;
- on the status of the science worker.

To draw up the draft law "On Science in the RSFSR".

To draft statutes:

- on the republic "Science Fund of Russia";
- on the procedure of the selection of the priority directions of scientific research and on the formulation and fulfillment of scientific and technical programs;
- on the independent state-public examination;
- on the new mechanism of the financing of state budget scientific research work, projects, and programs;
- on new forms of the integration of VUZ, academic, and sectorial science: science and technology parks, technopolises, intellectual zones and villages, and so forth.

To provide for preferential taxation, which creates favorable conditions for the acceleration of scientific and technical progress.

Presidia of Baltic Academies of Sciences Hold Joint Meeting

Lithuanian Announcement

91740036A Vilnius EKHO LITVY in Russian
7 Nov 90 p 3

[Article (ELTA): "Scientists Offer Assistance"]

[Text] As was already reported, a joint meeting of the presidia of the academies of sciences of Lithuania, Latvia, and Estonia was held in Riga. Academician Algirdas Zhukauskas, vice president of the academy, comments on the problems that were discussed at it.

"The goal of the meeting is the combining of the actions of scientists and the sharing of experience, the uniting of forces in conducting basic, regional scientific research. We came to the conclusion that the academies of sciences should play a more substantial role in the life of the republics, as is the case, for example, in Finland or Sweden. It seems that high-class specialists' objective conclusions and own opinions could help the government more substantially in making decisions. Taking into account the fact that the product being produced by us will be oriented toward the world market, it is necessary to increase sharply the scientific and technical level of industry. We spend two-to-threefold more fuel, power, raw materials, and other materials on the production of a unit of the national product than in countries of the West.

"At the meeting it was stressed that at present the problem of financing is particularly urgent for science. We also differ from the European states by the fact that the financing of scientific work accounts for one percent of the revenues from the national product, while in the West it accounts for two-three percent. Incidentally, we learned that the Estonian government had additionally allocated several million rubles for the financing of science and the increase of the salaries of scientists.

"The strengthening of the ties between higher educational institutions and the academies of sciences was also discussed—it is planned to train specialists jointly and to establish joint laboratories."

Academy Presidents Interviewed

91740036B Moscow POISK in Russian No 46 (81),
16-22 Nov 90 p 5

[Article by POISK correspondent Vladimir Steshenko under the rubric "What Is Science To Be Like?" (Riga): "Oh Give Us Freedom!"; words in boldface as published; first two paragraphs are POISK introduction]

[Text] "We assembled here not because of a good life," President of the Academy of Sciences of Estonia Arno Keyerna admitted.

The first joint meeting of their presidia in the history of the three Baltic academies took place in Riga.

The clouds over the academies of sciences began to thicken long ago. The same A. Keyerna believes that young scientists, who had begun to go abroad, brought the idea to eliminate the academy. True, later, having understood that they were cutting the branch on which they were sitting, they grew quiet. "But the seeds fell on fertile 'circumscientific' soil," Eduardas Vilkas, chief scientific secretary of the Lithuanian Academy of Sciences, laments, "now in all three republics there are forces which are prepared to destroy the academies of sciences all but as a 'legacy of tsarism.'"

They had not had time to beat off external criticism, when the wave of demands for independence on the part of institutes rose. True, now this "separatism" has also subsided. But the lead in the storm clouds over the academies did not decrease. "The standard of living is declining, people do not see the results of our efforts, which, for the most part, satisfied military needs," President of the Latvian Academy of Sciences Jan Liyel-peteris explains later on the decrease of the prestige of scientists in society. On the other hand, relations with the leadership of the republics are being formed with difficulty. And this is strange—after all, the new structures of power literally "ravaged" the academies and higher educational institutions, having claimed for their ranks the most socially active scientists.

I remember that back in the spring, on the day of the appointment of physicist Ivars Godmanis as chairman of the Council of Ministers of Latvia, when congratulating him, I asked: "What will happen with the Academy of Sciences?" "I do not know," replied the scientist who had become prime minister. "One thing is clear: Our small republic given the present difficulties will not tow such an Academy of Sciences."

Having placed the stress on the word "such," he did not explain precisely what kind. But philosopher Peteris Lakis, chairman of the standing commission for public education, science, and culture, explained at that time how the parliament intended to deal with the Academy of Sciences: "We have to eliminate the present system of the Academy of Sciences and transfer its institutes to the system of education. Real integration is needed. We will make the Academy of Sciences not a place of work, not a bureaucratic organization, but an association of scientists, to which the most worthy ones are elected."

Of course, the criticism in many respect is justified, but hasty conclusions and proposals, if they are implemented, could entail simply tragic consequences: They would orient the academy only toward problems, the solution of which would only quickly benefit one republic. While close contact with the "east," with the union Academy of Sciences, also worried the most aggressive critics.

Thus, the circle was completed. It remained to give oneself up humbly to the mercy of the victors or....

It is this "or" that the joint presidium worked out. It thought about how to make the public and the authorities to change their mind, in order not to allow the devastation of the scientific potential which had been accumulated in the republics.

For themselves it was clear that if the republics really want "to face Europe," they cannot do this without science. Hence, one must also not reduce the financing of science, which is wretched as it is. That it is necessary to participate without fail in union programs.... It was also clear that one cannot manage without the substantial reform of the Academy of Sciences.

Eduardas Vilkas, Chief Scientific Secretary of the Lithuanian Academy of Sciences:

"The 'science-state' relationship cannot be strictly regulated, but should preserve adequate space for the independent self-development of the system of science. It is possible to achieve this in different ways, but there are general principles. And the first of them is the autonomy of science and higher education. They serve not the state, but society and determine themselves how to do this. In order to neutralize the influence of political structures and the state bureaucracy on financing, in the aggregate it should be multichannel financing. Along with budget financing grants, funds, and subsidies of enterprises and private individuals are necessary.

"The Academy of Sciences could be the highest organ of self-management. However, owing to the present distrust of it on the part of the new structures of power this is difficult to accomplish."

Jan Lielpeteris, President of the Academy of Sciences of Lithuania:

"In our opinion, in the process of the integration of science and education it is necessary to observe at least two conditions. The first one is to guarantee the preservation of the scientific potential in case of reorganizations. The second one is to rule out the possibility of the administrative mechanical solution of the problem. It seems that on the basis of the laws, which have been passed and are being prepared, including the laws on science, education, and the scientific research institute, an organizational form, which would make it possible while preserving the sovereignty of the Academy of Sciences and higher educational institutions to combine a number of their functions, should be chosen. It is a matter of the training of highly skilled specialists from among undergraduates of the upper classes at academic laboratories under the supervision of leading scientists. Neither the Academy of Sciences nor higher educational institutions will be able to solve this problem separately. It would be advantageous for us to spend a portion of the assets, which have been released for scientific research, on education."

Arno Keyerna, President of the Academy of Sciences of Estonia:

"Under the new conditions the necessity of the more strict monitoring of the expenditure of the meager assets, which are being allocated from the budget of the republic for science, is arising. This makes it incumbent to make an inspection of the existing scientific directions, themes, and internal structure. But how is one to avoid losses here?"

"In Estonia the Scientific Fund for the Financing of Basic Science, the Fund of Information Science, and the Innovation Fund, mainly for applied research, have now been established.

"It is expedient to settle the question of participation in the USSR Basic Research Fund after the establishment of the principle interrelations of the budgets of the republic and the Soviet Union...."

The entire range of raised problems is not at all confined to these basic theses of the executives of the republic academies. They spent a long time formulating the conditions, under which the academies of sciences of the Baltic region could participate in union programs. They discussed in detail the nuances of the awarding of a bachelor's degree, a master's degree, and two doctoral degrees and interrelations with the Higher Certification Commission. But the main thing is that they debated what is the Academy of Sciences to be, perhaps a free association of institutes?

Academician of the Academy of Sciences of Latvia Jan Stradyn spoke in favor of the preservation of dualism (both institutes and the assembly of academies) if only because the transition to an exclusively personal academy is now simply not feasible. For the elections to the Academy of Sciences often were held on an administrative basis. While time is necessary in order to get rid of this legacy. But, the academician believes, it is also necessary to supplement the existing association with scientific societies and museums.

Everyone agreed that the association should be a free one: Let the institutes themselves decide with whom to enter into a union and when—with other institutes, laboratories and chairs of universities, and enterprises. Let them choose themselves the forms of management of such unions.

The joint meeting concluded with the signing of a final document, in which its participants addressed to the Supreme Soviets of the three republics the proposal to specify legislatively the autonomy of science and higher education, which would be guaranteed by state budget financing. There were included in the protocol the criteria, about which E. Vilkas spoke: Sufficient assets should be allocated for the maintenance of the level of the scientific potential, the increase of skills, and the development of promising research.

In it there is also a point, which recognizes the advisability of the participation of the presidents of the Baltic academies in the Council of Presidents of the Academies of Sciences of the Republics and the USSR, which is being newly established, provided that the independence and equality of each academy are recognized. Instructions on what principles to defend when discussing the draft of the statute on the all-union basic research fund were also given to the three presidents.

This point is far from a secondary one and, I will say frankly, required much courage, for it is a question in it of contact with Moscow, which is so "unfashionable" today.

Thus, the Baltic academies, on the one hand, displayed readiness for reforms and, on the other, put their terms on the table. Will they be accepted? I asked Janis Vayvads, chairman of the subcommission for science of the Supreme Soviet of Latvia, to express his point of view on what is happening.

"Many parliamentary speeches were made here, but the idea of integration with society was heard too weakly. And this will affect the parliament."

Yes, the leaden clouds over the academies of sciences, apparently, will not be scattered soon. In conclusion I will venture to recall a well-known maxim: "The prestige of the basic sciences in society shows the level of culture of the people." One of the discussion participants continued it: "...and the parliament."

Yes, we will wait for the debates in the parliament.

GSSR Academy of Agricultural Sciences Given Independent Status

917A0039A Tbilisi ZARYA VOSTOKA in Russian
3 Nov 90 p 2

[Article (SAKARTVELO INFORMATION AGENCY): "On the Paths of Revival"; first paragraph is ZARYA VOSTOKA introduction]

[Text] The constituent meeting of the Academy of Agricultural Sciences of Georgia was held on 31 October. Leading scientists and specialists of the sector took part in its work.

The academy henceforth will be a self-managed organization, which is formed according to the democratic principle, will act in conformity with the legislation of Georgia, and will assume the function of the highest center for the scientific support and the development of scientific and technical progress of the agroindustrial complex of the republic.

The constituent meeting admitted to membership of the Academy of Agricultural Sciences of Georgia full members and corresponding members of the All-Union Academy of Agricultural Sciences imeni V.I. Lenin and

the former Georgian SSR Academy of Agricultural Sciences, as well as full members and corresponding members of the Georgian SSR Academy of Sciences, who work in the system of the agroindustrial complex.

The meeting approved the structure of the academy, elected its presidium, and specified the number of full members and corresponding members of the Academy of Agricultural Sciences by sectors.

Academician Valerian Metreveli was elected president of the Academy of Agricultural Sciences of Georgia.

At the meeting an appeal to agrarian scientists of Georgia was adopted.

The Appeal of Agrarian Scientists of Georgia

Dear friends!

During these memorable days of the upsurge of the national movement Georgian agrarian science with the active support of the public of the republic has taken a firm step on the difficult path that leads to freedom and independence—the restoration of the Academy of Agricultural Sciences of Georgia, which was abolished during the years of stagnation, during the period of administrative command pressure and voluntarism.

This event is also noteworthy for the fact that it took place in the process of the collapse of the existing system of management, under the conditions of the crisis of the republic economy, during the difficult period of preparation for the transition to a market, when the consolidation of all national and patriotic forces and the uniting of intellectual and production capacities are extremely necessary. For the restoration of the agricultural academy under the conditions of the new system of agricultural relations, management, and different forms of property should to an even greater degree bring about the intensification and coordination of scientific research, the integration of science with production, and the improvement of the methods of introducing advanced know-how.

Henceforth this scientific center will act independently in conformity with the legislation of Georgia and the charter, which has been adopted at the general assembly of the academy, will base itself on the principles of self-management, democratization, and decentralization, and will promote from every standpoint the development of free creative thought.

Thus, about 50 scientific organizations of the republic with powerful experimental bases, three higher agrarian educational institutions, computer centers, and more than 2,000 scientists will specify themselves the basic directions and problems of work, the programs of research, and the means of their implementation. This entire enormous potential of agrarian science of the republic, of course, will play a large role in the sharp

increase of the efficiency of agricultural production of Georgia and in the search for means of overcoming the economic crisis.

We, the participants in the constituent meeting of the Academy of Agricultural Sciences of Georgia, regard the fact of the restoration of the academy as a historical event in the life of the people, and first of all as great confidence in us—the representatives of agrarian science.

Along with the expression of gratitude for this, we assure all of Georgia and the workers of the agroindustrial complex of the republic that, working side by side with the newly elected parliament of the republic, we will devote all our knowledge, experience, and efforts to advancing scientific research in every possible way, to aiding the introduction and production of the latest achievements of science and technology, and to helping the countryside in ensuring an abundance of agricultural products.

In the accomplishment of this and many other crucial tasks the academy is placing considerable hopes on agrarian scientists of the republic. In the fact that they will respond with deed to the adopted appeal and will joint enthusiastically in the work on the supply of the agroindustrial complex of the republic in a short time with the latest achievements of science and technology and in the struggle for the revival and independence of Georgia.

Prospects For Ukrainian Science Discussed

917A0034A Kiev PRAVDA UKRAINY in Russian
18 Oct 90 p 2

[Interview with Doctor of Economic Sciences Valeriy Ivanovich Tereshchenko, by A. Konovets: "Open the Way for Talented People. How Is Foreign Experience To Be Used in the Restructuring of Domestic Science? Doctor of Economic Sciences V. I. Tereshchenko Expresses His Point of View in This Regard"; date and place not given; first two paragraphs are PRAVDA UKRAINY introduction]

[Text] His name is well known not only in our country, but also abroad—as the author of many books and articles, which are devoted to management science. Having returned during the years of the "Khrushchev thaw" from emigration to his homeland, he did much for the revival of domestic economic thought owing to common sense. The personal experience of the scientist and practical economist, who, starting in the 1920's, went through the good school of management at various governmental organizations and firms of Europe and America, helped him in this.

Now the scientist is devoting much attention to the problems of the organization of science under the conditions of the transition to a market. For without the radical restructuring of scientific activity, as recent events of our hectic life have shown, it is impossible to reform the economy of the country. We asked Valeriy Ivanovich to share his thoughts on how he appraises the possibilities of the effective restructuring of Ukrainian

science in the context of the forthcoming economic reform in the country and how foreign experience could be useful for this purpose.

V.I. Tereshchenko: We are actually faced with the necessity of restructuring the entire system of scientific and technical activity in such a way that it would conform to the nature and character of the new economic relations, the scientist began the conversation. And here we cannot manage without the critical interpretation and the use of the experience of organizing science in such countries as the United States and Japan.

Let us take the system proper of the priorities of the development of science in these countries. It is aimed at the derivation of the maximum profit, which is inherent in the nature of a market economy. In general market relations themselves, in which science develops, require exceptional flexibility and efficiency in the policy of the formulation of priorities and their timely change in time. For example, in the United States the concept "continuous experiment"—the ability to manipulate the themes of scientific research, the ability to abandon obsolete directions at the right time and to switch over to promising directions—has even been elevated to a managerial principle. The system of priorities, which is in effect today in our country, is very sluggish and awkward. And, what is more, we are spending far less money on "pure science" than in highly developed western countries.

The Japanese and American orientation toward the domestic and foreign market when selecting research themes and determining their priority merits the most serious attention. The recently afforded opportunity to establish joint ventures with the participation of foreign firms is making this problem particularly urgent at present, inasmuch as the establishment of priorities for research should now be carried out with cautious regard for foreign practice as well.

PRAVDA UKRAINY: One should probably also not reject the historical experience of domestic science. For not in all cases is it possible to appraise it as negative, is it?

V.I. Tereshchenko: Of course. Take if only the 1920's, the period of the New Economic Policy, when relative economic freedoms existed and various forms of cooperation, particularly between the scientific and production spheres, were intensified appreciably. This yielded good end results. Or take the postwar experience of the planning and implementation of major goal programs—the development of space, research and development in the area of laser and welding technology, the devising of individual types of materials, and others. We still have to interpret properly and thoroughly the past of our science and the history of its achievements, errors, and failures.

PRAVDA UKRAINY: The quality of the determination and the timeliness of the change of priorities depend on the available forecasting information. It is well known what an acute shortage of information our organizers of science experience at times. What ways of solving the

problem of the information support of scientific and technical progress under the conditions of a market do you see?

V.I. Tereshchenko: The market orientation of scientific activity requires the intensification of the work of marketing institutes, particularly the scientific research marketing institute of the USSR Ministry of Trade, and the constant contact of scientific research institutes of any type with them, that is, the lifting of many obsolete restrictions with respect to access to foreign information resources.

In our times it is impossible to count on the successful implementation of one's own scientific achievements, without engaging in the active search for and use of results that have been obtained in other countries. Harvard University Professor D. Brooks stressed at one of the hearings of the U.S. Congress in 1986. In this connection he proposed to establish special information centers for the analysis of foreign know-how, the translation of the corresponding literature (especially Japanese literature), and its dissemination in organizations that conduct scientific research. It seems that the proposal of D. Brooks also merits attention as applied to our conditions. The coverage of the results of the work of our scientific research institutes should not be confined to traditional scientific information channels. It requires the most extensive and popular publicity.

PRAVDA UKRAINY: In connection with the increase of the role of the local soviets of people's deputies and the economic rights of enterprises it would be interesting to find out, what part are local organs of authority taking in the organization of science in foreign countries?

V.I. Tereshchenko: Here it is appropriate to cite the experience of the United States. A significant share of the allocations for science there come from the budget of local authorities which are interested in certain research. Thus, up to 40 percent of the assets, which should aid universities in the modernization of their research equipment, during 1987-1991 will come from the budgets of states. Local authorities are agreeing to such expenditures, of course, not only for the sake of scientific knowledge. They see the main advantage in the fact that research work promotes the obtaining of orders for the development of projects by industry of the given state. For this reason local political figures are acting as champions of the development of scientific research parks. In a number of states the position of scientific associate of the governor is envisaged, while in the states of Kansas and Mississippi the first special organizations for the coordination of local scientific research were established back in the 1960's.

To some extent these organizations are reminiscent of the scientific centers of the Ukrainian SSR Academy of Sciences, which were established in the Ukraine in the 1970's. But, as far as I know, whereas in our country the regional scientific centers perform only a coordinating role in the conducting of research and development for local needs and acts as public scientific organizations,

the special scientific organizations attached to the states have a financial and legal basis for their activity.

PRAVDA UKRAINY: With the transition to a market economy the problem of demonopolizing scientific production will have to be solved without fail. In recent times in circles of economics scholars more and more hopes have been placed on the phenomenon of "small enterprises." What are the real chances of realizing these hopes?

V.I. Tereshchenko: It is possible to predict confidently: In connection with the transition to a market economy the role and share of small, so-called venture scientific organizations and groups, which are capable of promptly conducting scientific research and development and quickly reacting to the demands of industry, will increase in every possible way. Foreign experience testifies to this. Surveys showed that small firms, including risk firms, in recent years in the United States have accounted for 25-30 percent of the major inventions. The venture business is contributing to the increase of the employment rate of highly skilled specialists, while weeding out at the same time the scientific personnel who are not capable of revolutionary creative thinking.

PRAVDA UKRAINY: Today we are seeing—this is visible, at any rate, in our country—how the role of the personality of the scientist is increasing. An example of this is the revolutionizing influence of the ideas of Academicians A. Sakharov, V. Glushkov, N. Amosov, and N. Moiseyev and other intellectuals. What are the trends now in world science?

V.I. Tereshchenko: World experience refutes the popular assertion that the time of individual movers of science has passed completely into history. By no means denying the importance of collective scientific research, A. Einstein said: "I would not advise forming a collective of inventors owing to the difficulty of determining the real inventor. I believe that only a society of loafers, who seek shelter from work, can come of this."

Again I will cite the experience of Americans. The National Bureau of Standards had received by 1979 in all more than 11,000 proposals on innovations in the area of nonnuclear power engineering mainly from precisely individual inventors. Moreover, the practice of governmental organs shows that up to 50 percent of the promising proposals are received from people, who with respect to specialty are far from the nature of the proposals made by them, 30 percent are from people of related professions, and 20 percent are from people who are working professionally on these problems. Hence the enormous importance which is being attached in developed countries of the West to the financing of the research of individual scientists, the identification of generators of new ideas, and the creation of favorable conditions for the work of individuals with the assistance of an exceptionally developed system of all kinds of grants, stipends, and other types of aid. This experience should also be adopted here in the Ukraine, supporting by various kinds of subsidies the most creatively talented scientists.

PRAVDA UKRAINY: Valeriy Ivanovich, the implementation of such large-scale changes in the sphere of the organization of science, of course, requires the corresponding scientological developments, the mastering of the methods of the forecasting evaluation of the development of events, as well as a system of the increase of managerial experience in the management of science. How prepared are Ukrainian scientologists to solve these complex problems?

V.I. Tereshchenko: The Center of Studies of the Scientific and Technical Potential and the History of Science of the Ukrainian SSR Academy of Sciences, the first one in the country, which bears the name of its founder, Corresponding Member of the Ukrainian SSR Academy of Sciences G.M. Dobrov, was organized and is operating successfully here in Kiev. Here development on the improvement of the organization of domestic science is being conducted and the long-term planning and forecasting of the dynamics of science and studies of the socioeconomic problems of scientific collectives are being carried out. A seminar-school on the increase of the administrative skills of management personnel of the Ukrainian SSR Academy of Sciences is organized regularly at the Center. Kievan scientologists are taking an active part in the implementation of a number of international programs, particularly in UNESCO research projects.

The international symposium "Modern Scientology and the Restructuring of Soviet Science," which was recently held in Kiev, was of great importance for the elaboration of a new concept of scientific and technical cooperation under the new socioeconomic conditions. During the period of work of the symposium the Constituent Congress of the International Association of Scientology and the Promotion of the Development of Science was held. This public organization will contribute to the training of national personnel in the area of scientology and the organization of the training and practical studies of young scientists at leading scientological centers of the world and will give assistance in the formulation of scientific policy and the development of management in science. The establishment of the International Center for Scientology under the aegis of the association is envisaged. Kiev by right is aspiring to be the capital of this center.

Georgian Academy of Sciences Granted Independent Status

917A0035A Tbilisi ZARYA VOSTOKA in Russian
27 Oct 90 p 1

[Ukase of the Presidium of the Georgian SSR Supreme Soviet of 24 October 1990 "On the Status of the Self-Management of the Academy of Sciences of Georgia"]

[Text] For the purposes of the assurance of free scientific creativity, the gradual democratization and decentralization of the management of academic science, the giving of extensive rights to scientific institutions of the

academy, and the further development of the basic sciences the Presidium of the Georgian SSR Supreme Soviet resolves:

1. The Academy of Sciences of Georgia is a self-managed organization, which operates only in conformity with the prevailing legislation of the Georgian SSR and the Charter of the Academy of Sciences of Georgia and independently supports the functioning of the system of the academy.
2. To transfer to the ownership of the scientific institutions and organizations of the Academy of Sciences of Georgia the fixed capital and other state property, which today is at their disposal without the right of alienation, and to define their status in conformity with the legislation on property.
3. To retain the special-purpose financing of the basic scientific research, which is being conducted by the Academy of Sciences of Georgia, from state budget allocations; the Academy of Sciences of Georgia submits to the government of Georgia a report on its financial activity.
4. The Academy of Sciences of Georgia promotes the development in the republic of various fields of sciences; establishes direct scientific ties, forms together with different countries joint scientific organizations and centers, carries out the exchange of scientists, and uses other modern forms of international scientific cooperation.
5. The Presidium of the Academy of Sciences of Georgia is to establish the procedure of determining the new salaries and wage rates of the scientific personnel of institutions of the academy within the limits of the earmarked budget allocations.
6. For the settlement of the above-indicated questions the Georgian SSR Council of Ministers is to adopt the corresponding decrees, which envisage:
 - measures on the improvement of the material supply and living conditions of scientific personnel and associates of the Academy of Sciences of Georgia;
 - the procedure of the formation from the internal assets of the Academy of Sciences of Georgia and its institutions of special funds for the solution of social problems, except for measures which are envisaged by the Law on State Social Insurance;
 - the introduction of a contract system of the offering of work to scientists at the Academy of Sciences of Georgia (including the offering of work to scientists from abroad) and the independent establishment of the rates of the remuneration of labor for people who work under contracts.

[Signed] Chairman of the Presidium of the Georgian SSR Supreme Soviet G. Gumbaridze

Secretary of the Presidium of the Georgian SSR Supreme Soviet V. Kvaratskheliya

Tbilisi. 24 October 1990.

USSR Academy of Sciences General Meeting Closed to Journalists

917A0048A Moscow IZVESTIYA (Union edition)
in Russian 15 Dec 90 p 3

[Letter to President of the USSR Academy of Sciences Academician G. Marchuk from the Science and Technology Department of IZVESTIYA: "Will They Not Let Them in Again? An Open Letter of President of the USSR Academy of Sciences Academician G. Marchuk Concerning the Closed General Assembly of the Union Academy of Sciences"]

[Text] The event is an unprecedented one. The USSR Academy of Sciences did not admit journalists to its general assembly, which opened on 14 December. Such a thing has not happened with IZVESTIYA, as the editorial historians confirm. But other mass media, including the academy's own newspaper POISK, were also not invited.

President Academician G. Marchuk explained everything very simply: "This is an internal affair of the academy. But if this is interesting to you, I will tell you everything later." Imagine, Guriy Ivanovich, it is interesting. Both to us. And to millions of readers. After all, the academy is electing a new generation. There were a good deal of "ambiguous" statements about this question in the press. And the readers, of course, would like to familiarize themselves not only with your official impressions, but also with views from the side—through the eyes of journalists of various publications. No one, after all, seriously thinks that by their presence they will influence the election results themselves.

But in general our scientific authorities understood in a strange way the new status of the USSR Academy of Sciences, which was granted by the President, and its independence from state structures. Whereas many state services are opening their archives and are inviting representatives of the press to their "sanctums," which yesterday were still closed to access, the presidium of the academy, on the contrary, is turning into a secret what was never before such.

[Signed] The Science and Technology Department of IZVESTIYA

Conference on Science in Future Leningrad Free Enterprise Zone

917A0045A Moscow RADIKAL in Russian No 3,
Nov 90 p 2

[Article by Yelena Druzhinina: "The English Debut of Leningrad Science"—first paragraph is RADIKAL introduction]

[Text] In Leningrad they are seeking means of the least painless transition from the rigid, inefficient system of scientific research activity to infrastructures of science, which are analogous to those existing in developed countries.

At the conference "The Problems of Science in the Leningrad Region Under the Conditions of the Transition to a Market" scientists are planning their future. As is known, this region in the immediate future should become a free enterprise zone, and the scientific institutions of the city and oblast have to not simply blend with these new lifelike structures, but, very likely, give the lead in their formation. In Leningrad there are more than 40 academic institutes, 26 institutes of the military-industrial complex, 42 higher educational institutions, and several hundred sectorial scientific research institutes. The need for the redistribution of forces has arisen for the entire army of scientific personnel.

In conformity with its status the Leningrad City Soviet, particularly its commission for science and the higher school, dealt with the switching of Leningrad science over to an intelligent infrastructure. It is headed by Aleksandr Shungurov. The 39-year-old doctor of biological sciences temporarily left scientific work in order to engage in public activity. He is a staunch democrat and one of the founders of the Leningrad Perestroika Club and the Leningrad Union of Scientists. In his words, the creation of normal conditions of the existence of scientific research organizations of all levels is more important than personal scientific work.

The organizers invited to the conference all scientific personnel of the city, to whom the fate of domestic science and their own fate are not indifferent. About 700 such people assembled, which is entirely sufficient for the choice of a collective strategy for the transition of science to a market.

Large blocks of problems concerning various aspects of science: basic science, commercial scientific activity, associations and groupings of scientists, science and conversion, and the social protection of scientists, were discussed at the conference. In particular, it was decided to establish a market of proposals of Leningrad scientific research institutes. An information bank on existing developments and an intellectual labor exchange are necessary for this. The establishment of a fund for the financing of basic research was recognized as necessary. This fund will be formed at the level of the city and the entry for philanthropy from manufacturing firms, which are interested in the development of one field of science or another. [as published]

The proposal on the protection of the intellectual property of scientific personnel interested many people very much. At the conference the decision was made that if within a year (or five years for secret themes) some scientific and technical proposal is not implemented, the author has the right to transfer it to any firm. This principle will be a part of the legislative acts on the Leningrad free enterprise zone and will be proposed as a legislative act to the Supreme Soviets of the republic and the Union. All the decisions of the Leningrad City Soviet or through the parliament of the republic. [as published] While their execution will become the duty of the new department of the executive committee for science and the higher school.

In Leningrad they are seeking means of the least painless transition from the rigid, inefficient system of scientific research activity to infrastructures of science, which are analogous to those existing in developed countries. In particular, the English system of the organization of science was examined at the conference. Aleksandr Shungurov does not conceal the fact that he sees his task in the establishment of

precisely such infrastructures. "Enough of our taking unexplored roads," he says. "It is time to take the experience of civilized mankind and to introduce it, of course, not by blindly copying it, but by adjusting it for our conditions. Leningrad science can become and will become a testing ground for the development of the mechanism of the transition to a market. The first steps have already been taken."

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